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THE GEOGRAPHICAL JOURNAL

Vol LXXII No 2 August 1928

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THE GEOGRAPHICAL JOURNAL is published monthly by the Royal Geographical Society. It contains the papers read at the Meetings of the Society, with the discussions: illustrated with original photographs, and with maps drawn from the authors' surveys by the draughtsmen of the Society. It contains also Articles on geographical topics; Reviews of important books and maps; a Monthly Record of Geographical work; and occasional Letters from Correspondents.

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The GEOGRAPHICAL JOURNAL

Vol LXXII No 2 — R.G.S. — *August 1928*

ADDRESS AT THE ANNIVERSARY GENERAL MEETING

of the Society held on 18 June 1928, by the President

COLONEL SIR CHARLES CLOSE

K.B.E., C.B., C.M.G., F.R.S.

IT is only right that this Address should commence with a brief tribute to the memory of some of those distinguished Fellows of our Society whom death has claimed during the past year. For we have indeed suffered serious losses, which the Society will feel for many a long year, of men who have made their mark in the world, whose fellowship with us, in this great Society, was a source of strength and encouragement.

The sudden death, in November last, of our President, Dr. Hogarth, deprived the Society of the leadership of a geographer of deservedly high reputation, whose learning had made for himself a special place in the historical side of the subject, and whose travels in the Near East had done much to improve our knowledge of that interesting region. His breadth of view ever made him a wise guide and adviser; his counsel was ever at the disposal of those who sought it; and his administrative ability and knowledge were conspicuously shown in his direction of the affairs of the Ashmolean Museum, of the Arab Bureau at Cairo, in his chairmanship of the Palestine Exploration Fund, and as President of this Society. As is known to all of us, an admirable Memoir on the life and work of Dr. Hogarth was written by Mr. C. R. L. Fletcher, and published in the *Geographical Journal* for April last.

Field Marshal Earl Haig had been a Fellow of the Society since 1894. His work as a soldier is written large on the pages of history. His death in January last removed a very distinguished Fellow. Like other successful soldiers, he fully realized the vital necessity of the study of geography as applied to military problems, and that geography and the military art go hand in hand.

We have also to deplore the loss, during the past year, of that most accomplished and versatile traveller, explorer, and administrator, Sir Harry Johnston. He became a Fellow in 1883, he had been a Member of Council and a Vice-President, and was awarded the

Founder's Medal for his explorations in Africa in 1904. He died nearly a year ago, on 31 July 1927, in his seventieth year. He had lived a remarkably full life. Not only did he know Africa as few know it, for his name is associated with journeys in Angola, in the Kilimanjaro region, in the Cameroons, Portuguese East Africa, Uganda and Liberia; but in East Africa, and even more in Nyasaland, he took a prominent share in establishing the Government of this country. He was a pioneer administrator, and Sir Alfred Sharpe, who worked with him, has said that it is mainly due to Johnston that "the whole of the country between Lake Nyasa on the east and Lakes Bangweulu and Moero on the west came under the British flag." In the midst of all this work he found time to write excellent accounts of the countries that he visited. I have before me, as I write, his remarkable book, in two volumes, on the Uganda Protectorate, with many admirable illustrations in colour from his own brush. It was only a short time ago that a lecturer, describing a journey in Liberia, said that he got the most valuable information from Johnston's book on that country. He was an intrepid explorer, he wrote admirably, he was a musician, and was a deep student of the customs and languages of the natives of Africa. His book 'The Story of my Life,' is full of the history of the settlement of tropical Africa, in which he had taken so large and so honourable a part.

On February 26 last Canada lost one of her most important geographers, and this Society a distinguished Fellow, by the death, at the age of sixty-five, of Mr. James White. He graduated at the Royal Military College, Kingston, in 1883, and in the following year joined the Geological Survey of Canada as Assistant Topographer. He carried out surveys in the Rocky Mountains, in Ontario and Quebec, and eventually was appointed Chief Geographer to the Department of the Interior. He had much to do with the Alaskan Boundary Commission. In 1909 he was made Secretary of the Commission of Conservation; and then in 1921 was appointed Technical Adviser to the Minister of Justice. Amongst other important duties he prepared much of the evidence for the Labrador Boundary case, which was heard before the Judicial Committee of the Privy Council in 1926. In 1927 he was elected Chairman of the Geographic Board of Canada.

Of matters generally affecting the future of the Society, I will only speak of one, and that is the proposed building of a new lecture-hall and library on the ground at Lowther Lodge, adjoining the Society's House. This project was originally put forward by Lord Curzon when he was President; and it may be mentioned that one compelling reason for going to Kensington for our House was that it was there possible to purchase, with the house, sufficient land on which eventually to build a lecture-hall. Owing to the War it has only recently been possible to arrange for the disposal of our superfluous land, in order thereby to place us in possession of money wherewith to start the scheme. We have now available money which will enable us to make a good start, but we have not enough money for financing the full

scheme. Our late regretted President, Dr. Hogarth, was fully convinced of the necessity, for the future prosperity of the Society, of having a lecture-hall of our own. But he was equally convinced that another crying need was the provision of adequate library accommodation. Our magnificent geographical library is at present housed in a make-shift manner. Thousands of the books are placed in corridors and passages, inconvenient for use, and a source of delay. Next to the provision of a hall—indeed, some would place the need first—we require good library accommodation, for our books are badly housed now, and their numbers grow at a large rate every year. If we are to maintain our position as the centre and focus of geographical knowledge and effort in the Empire, we must see to it that that indispensable part of our machinery, our library, is suitably installed.

And now, if I may revert for a moment to the question of the hall, most of us will remember the old theatre at Burlington House, which we were allowed to use for so many years, by the courtesy of the Government. That theatre had many advantages. It seated considerably more people than the hall which we now hire, and the arrangement of the seats and dais was far more convenient; any one, for instance, could approach the dais and talk to the officials seated there, and a speaker had only to step forward on practically the same level, instead of climbing a miniature cliff to get on to a concert platform. Then, after the lecture, at Burlington House we used to adjourn to some adjacent rooms and have tea, and talk and look at pictures and photographs. The whole arrangement was far more pleasant and friendly than it is at present. The new lecture-hall should be so designed as to re-capture the old friendly atmosphere, in addition to providing us with the extra accommodation which we desire.

The Council, with all these matters in mind, has had a report prepared by a distinguished architect, who has succeeded in indicating how a progressive scheme can be devised which shall give us the hall, the meeting-ground, the library extension, and the various necessary adjuncts. The scheme provides for a minimum expenditure of from £30,000 to £35,000, which would only give us the theatre and meeting space; and a maximum expenditure of £50,000, which would give us these, in addition to a dignified library which we so much need, and a re-arrangement of rooms which would simplify the everyday working of the Society. We have now the opportunity of improving our House, so that it shall be in every way worthy of the position which we hold as a Society. The Council has available a sum which may be reckoned at about £30,000, and appeals to the Fellows to subscribe what is wanted to complete the scheme. We hope that all those Fellows who realize what their Society is doing in the world, will contribute according to their ability.

To turn now for a moment to the work of the Society in the field. I will not mention individually all the excellent papers which have been read before our Meetings during the session, but I must refer to those which were the outcome of projects originated or helped by the Society.

Major Cheesman took with him to the Blue Nile many of the Society's instruments, as did Mr. Francis Rodd to the Southern Tuareg country. Mr. Watkins' Cambridge Expedition to Edge Island was assisted by a grant from our funds; and the whole cost of attaching Mr. Geoffrey Laws as geographer to the British Museum Expedition to Lubaantun was defrayed by us. We were also able to put by a first grant for Mr. Rey's intended Blue Nile Expedition. During the present year we have been able to make small grants to the geographical side of Miss Caton-Thompson's work in the Fayum, and Mr. Leakey's Expedition to the Eastern Rift Valley. We are able to give rather more substantial assistance to Mr. Watkins' Labrador Expedition; to send the photo-theodolite to the Drakensberg in charge of Mr. Woolley; and to bear much of the cost of attaching two geographers, Messrs. Steers and Spender, to the Great Barrier Reef Expedition. A good augury for the future of British exploration is the activity in this field of so many young University men and women. Our Society must be in a position to help them with instruments and money. We have been greatly assisted in this by several donations to the Expedition Fund, mentioned in the Annual Report, and I commend the support of this fund to your benevolence.

In a few weeks we shall have the pleasure of welcoming to our House the delegates and members of the International Geographical Congress on their way to Cambridge for the meeting under the auspices of the International Geographical Union. Let me briefly survey the origin, history, and proceedings of these assemblies.

Those periodical gatherings of geographers from all over the world, which are known as international geographical congresses, have a considerable interest for students of the subject, because, at such meetings, the various aspects of geography are discussed from many varied points of view. Science is essentially international, and every worker finds, from time to time, the need of freeing himself from the intellectual preoccupations of his fellow-countrymen. This is especially the case with geography, which, of all branches of knowledge, requires most to be studied from the standpoint of a citizen of the world. The writer of this brief account thought, therefore, that an outline of what has been done at past geographical congresses might be of some service to students of the history of geography, and to those who may attend the congresses of the future. The account has been chiefly compiled from the published reports, issued in each case by the promoters of the congress. But the writer has been fortunate enough to have attended the last three congresses, and is in consequence personally acquainted with the general conditions of work, with the methods of procedure, and, more important than all, with the friendly atmosphere of these international gatherings.

The First International Geographical Congress is associated, most appropriately, with the names of Ortelius and Mercator, and it happened in this way. Some time before 1869 a project had been set on

1001 to erect a statue of Abraham Ortelius in his native city of Antwerp ; and, about the same time, a committee had been called into being to arrange for the erection of a statue of Gerhard Mercator in his native town of Rupelmonde. Now, it occurred to M. Charles Ruelens, Keeper of the Royal Library at Brussels, that no better way could be found of honouring these sixteenth-century geographers than by holding a general meeting of the geographers of the world, who should discuss the matters belonging to their science, at Antwerp, on the occasion of the unveiling of these statues. Now, as it happened, the statue of Ortelius was not erected, and the Franco-Prussian war prevented the Congress being held, as originally proposed, in August 1870. But the Congress was eventually held in August 1871, from the 14th to the 22nd of that month. The statue of Mercator had been already unveiled in May of that year, at Rupelmonde, so that the intended association of the Congress with the actual unveiling of the two statues did not take place. The Congress was, nevertheless, closely associated with the names of these geographers, and it is doubtful if there would have been a Congress but for the original intention thus to honour their names. M. Ruelens, in an address delivered at Antwerp in November 1869, to a body interested in the project, said that in conversation with two learned geographers in Paris, the idea rose up in his mind to summon to the feet of Mercator and Ortelius all those who, in the two worlds, had made a name for themselves in the science of world knowledge ; illustrious travellers ; the creators of the great international routes ; and those also whose commercial activity had established new relations amongst the nations.

The realization of this fruitful idea was rendered possible by the active support of the Government of Belgium and of the City authorities of Antwerp. The support of foreign geographers was sought and readily given. Sir Roderick Murchison wrote, in May 1871, to say that it would have given him the greatest pleasure to promote the success of the Congress, but that he had been afflicted by a serious attack of paralysis, which was compelling him to resign the chair of the Royal Geographical Society. Amongst those who actually attended may be found the names of Erasmus Ommanney, d'Avezac, de Quatrefages, Petermann, Kiepert, Commodore Maury, and Garnier, the explorer of Cambodia. Special Medals were awarded by the Congress to Garnier, Livingstone, and de Lesseps.

The full title of the Congress was, " Congrès des Sciences Géographiques, Cosmographiques et Commerciales," but it was usually known as the Congrès des Sciences Géographiques. It was divided, in a rather curious way, into three sections, namely, the Section of Geography, the Section of Cosmography, Navigation and Commerce, and the Section of Ethnography, which worked alternately in general assembly. Subjects were definitely set beforehand for discussion, and these subjects were placed before the Congress in the form of questions. Thus, there were 26 questions under the heading Geography ; 22 under Cosmography ; 36 under Navigation and Commerce ; and a modest

3 for Ethnography. By studying these 87 questions we can form some idea of the matters which were then thought of greatest interest in the geographical world. What are the best ways of teaching geography? What is the best projection for use in atlases? What copies exist of Mercator's original maps? Could the Congress adopt a uniform system of orthography for maps and geographical works? What is the teaching of science with regard to Atlantis? How best to reach the poles? Could not an understanding be arrived at with regard to a standard initial meridian? How best to continue researches on the depths, temperatures, and conditions of the oceans? What are the variations of the Gulf Stream? Is there an ice-free sea at the North Pole? Could not the Congress stimulate South Polar exploration? Should the Congress call attention to the desirability of geodetic triangulation in the South of Africa and of America? Is it desirable to encourage the decimal division of the quadrant? Is it possible to arrange for the establishment of a central geographical establishment? What is the most favourable line for cutting a canal across the American Isthmus? Does the moon exert any influence on the weather? What are the meteorological consequences of deforestation? What would be the consequences of the creation of a sea in the Sahara Desert? What is the present distribution of the races of man, and what are the tendencies for certain races to take the places of others?

As to the numbers, about 600 " adherents " are noted in the report; but it would appear that a large proportion did not actually come to the Congress. Perhaps some 400 attended, of whom about two-thirds were Belgians. As an adjunct to the Congress there was an exhibition of maps, charts and globes, instruments, chronometers, and geographical books. The Congress was eminently successful, not only in itself, but in setting a fashion which has lasted to our days, and will, no doubt, continue into the distant future. Geographers should remember the debt which they owe to M. Charles Ruelens, " conservateur à la bibliothèque royale de Bruxelles."

The Second International Geographical Congress was held in Paris from the 1st to the 11th August, 1875, four years after the first, or Antwerp Congress. It was organized by the Société de Géographie de Paris, and it included the establishment of an Exhibition, as an adjunct to the Congress. The Congress was divided into seven groups, viz. Mathematical, Hydrographical, Physical, Historical, Economic, Didactic, Explorations and Voyages. The exhibition of geography was opened earlier than the Congress, on July 15, and remained open after the Congress had closed, until September 16. The circular letter issued by the Executive Committee opened with these words: " La connaissance de notre habitation terrestre est, comme l'a dit un de nos géographes les plus distingués, la science à laquelle nous nous rattachons par les liens les plus intimes: peu de sujets touchent à de si nombreux et de si grands intérêts." (Vivien de Saint-Martin.) Admiral de La Roncière-le-Noury, President of the Société de Géo-

graphie, was President of the Congress. The Executive Committee of the Congress consisted of seven members, mostly members of the Council of the Société de Géographie.

A list of 123 questions was got out and circulated to those taking part in the Congress. The questions were divided amongst the seven groups mentioned above. In those days geography frankly included geodesy, geo-physics, and meteorology—subjects which are now dealt with by the Geodetic and Geophysical Union. But omitting these, many of the questions are, so to speak, alive to this day. Thus, the choice of map-projections of the various states, and the best systems to adopt; the study of ocean currents; the fixing of beach-marks to study vertical movements of the crust; the lithology of the depths of the sea; the geographical distribution of the various races of mankind; the geography of early migrations; the spelling of geographical names; the causes of emigration; the state of the communications between Europe, India, and China; the best ways of teaching geography; what explorations are most urgent? But it must be confessed that a good many of the 123 questions were not of a very practical character, and many have solved themselves during the last half-century.

Amongst those attending the Congress were Ferdinand de Lesseps; Grandidier; Col. Laussedat, so well known for his advocacy of photography in mapping; Commandant Perrier; Adrien Germain, whose book on map-projections has placed geographers for ever in his debt; General Ibanez; Sir Henry Rawlinson, then President R.G.S.; Petermann; Richthofen, President of the Berlin Geographical Society; Perthes; Otto Struve, and many others well known in the history of science.

In a discussion which took place on the subject of map-projections Germain contributed some very sound remarks, insisting on the necessity of considering in each case the purpose which the map was to serve, and pointing out that in those days otherwise excellent atlases were brought out in which no care had been taken to study the question of the most appropriate projections.

Another interesting discussion was that on the adoption of the centesimal division of the quadrant in place of the customary sexagesimal. The discussion, which began in the mathematical group, was later on continued in a joint session of the mathematical, hydrographical, and educational groups. The ordinary sexagesimal division had a narrow victory of 28 to 26, the hydrographers being in the main against any change, and the mathematicians in favour of it, though Struve voted, for practical reasons, against a change.

A valuable definition was propounded by Fr. Alexis, in the educational group: Définition: L'objet de la géographie est double: en premier lieu, la connaissance de la configuration naturelle de la surface terrestre, considérée en elle-même (géographie physique); en second lieu, l'étude du rapport de la Terre avec ses habitants (géographie politique, ethnographique, économique, etc.).

The Third Congress was held in Venice, from the 15th to the 22nd September, 1881. The President was the Prince di Teano, President of the Geographical Society of Italy. The number of those who actually attended the Congress was 784, and of this number 451 were Italians. As before, there was a geographical exhibition, and this lasted from the 1st to the 30th September.

The Congress was divided into the following eight Groups: Mathematical Geography, Hydrographical Geography, Physical, Anthropological, Historical, Economic, Educational, Explorations. Before the opening of the Congress 56 questions were circulated to the geographers of all countries. Here are some of the questions: Should not Levelling of Precision be repeated at long intervals, in order to study variations of altitude? the application of photography to surveying; the examination of the levels of the surface of the Mediterranean in ancient and modern times; the results of the acclimatization of Australian plants in Europe; the geographical distribution of nervous ailments; the origin of the names of the cardinal points, north, east, etc.; the spelling of geographical names; the use of a system of tints for altitudes; the foundation of a Universal Geographical Union; and so on.

The first question in Group VII deserves a paragraph to itself. The inquiry is: "To determine what is the scientific concept of Geography and its limits in relation with other sciences." The Reporter, Dalla Vedova, comes to no definite decision, and thinks that there is no generally acceptable conclusion. But he puts the question in another form, thus: "Should Geography be confined to registering, classifying, and representing the terraqueous forms, or may it inquire into causality, and in that case how can it be restrained from invading the territory of other sciences?"

Amongst the geographers present at the Venice Congress we find the names of Lord Aberdare (President R.G.S.), Ferdinand de Lesseps, Ferrero, Kiepert, Nachtigal, Perthes, Schweinfurth, and Vambery.

It is stated that this Congress "was carried out on a larger scale and with greater ceremony" than its two predecessors. The King and Queen of Italy were present at the opening ceremony. The exhibition was of considerable importance. "Complaints were indeed made that the exhibition rather starved the Congress." For many eminent geographers were obliged to spend much of their time in discussing awards, instead of attending the meetings of the Congress.

For the Fourth Congress the scene shifts again to Paris, in which city it took place from the 5th to the 11th of August 1889. The chief reason for holding this congress at Paris was that it was determined to profit by the Paris Exhibition, which took place that year. The President of the Congress was Ferdinand de Lesseps, President of the Société de Géographie.

This Congress was divided into seven groups: The Mathematical Group, which included geodesy, hydrography, topography, and cartography; the Physical Group; the Economic; the Historical; the

Didactic; Travels and Explorations; and the Ethnographical and Anthropological Group.

As before, a list of questions was got out and sent round with the preliminary circulars. Altogether 92 questions were placed before the delegates. Many of the questions in Group I were purely geodetic, and nowadays would be dealt with by the Geodetic and Geophysical Union. Amongst other questions we find one as to the use of ballooning and photography for map-making; in discussing balloon photography it was stated that the first balloon photographs were taken by Nadar in 1851. The suggested centesimal division of the quadrant—and of the day—was again debated; no vote was taken, but Col. Bassot mentioned that the Service Géographique was preparing tables on that system. There was an interesting supplementary question as to the application of the arts of design to cartography—a matter which could be pursued to-day with advantage. Then there were arctic and antarctic problems; and a good discussion on various migration problems, especially as regards migration to the Argentine Republic; M. Carrasco treated migration as simply "the re-establishment of an equilibrium disturbed by population pressure." On the same subject it was estimated that in 1889 there were more than a million foreigners in France; half of these Belgians, and a quarter Italians. Other subjects discussed were: the economic consequences of deforestation; pilgrim routes in Europe; early relations of China with Europe; an unpublished globe of the school of Schöner; a project for the construction of a globe on the scale of 1 : 100,000—such a globe, it may be mentioned, would be over 400 feet in diameter; the distribution of black races in Africa; and an excellent suggestion that travellers should always use native place-names. About 530 names appear on the general list of members of the Congress, and amongst these the best known to us now are Vidal de la Blache, de Saussure, Lessar, Francis Galton, and our old friend Charles Lallemand.

As an additional volume to the Report of the Congress there was published a report on the maps, voyages and travels of a large number of different countries. The first hundred pages of this volume are devoted to an account of the topographical maps of Europe by General Derrécagaix. The report is not without interest forty years after. The maps of the Ordnance Survey are subjected to a critical examination. There are some errors in the report, as when it is stated that at that date Ireland had no 6-inch maps; but some of the criticisms are just, as when it is remarked that the representation of the relief on the 1-inch maps of that day left a good deal to be desired.

The Fifth Congress took place at Berne, from the 10th to the 14th of August 1891, and again as an adjunct to the Congress there was an Exhibition. The Exhibition was divided into three sections: a scholastic section, an alpine section, and a section devoted to the history of Swiss cartography. The Congress was organized by the Geographical Society of Berne, with the support of the Geographical

Societies of Aarau, Geneva, Neuchatel, and St. Gall. The President was Dr. Gobat, President of the Geographical Society of Berne.

Berne was celebrating the seventh centenary of the foundation of the town, and it was desired to hold the Geographical Congress in the same year, 1891. The organization of this Congress was therefore somewhat hurried, partly because only two years had elapsed since the Congress of Paris, and partly because the news of the approval of the Congress had only been received from Paris in July 1890. The Congress was not divided into sections, but the sessions were labelled " general " or " special " on a system which is not now very easy to discover. But this is only a matter of mechanism, and the Congress did some good work.

And of this work the most important item was the putting forward by Professor Dr. A. Penck, of the University of Vienna, of a proposal entitled " Die Herstellung einer Karte der Erde im Massstab 1 : 1,000,000." The matter was referred to a small preparatory committee of seven members, amongst whom were Penck, Keltie, and Supan. It was brought before the Congress at its final meeting, and the proposition was passed in this form : " Le Congrès des sciences géographiques de Berne décide de prendre l'initiative de l'étude d'une grande carte de la Terre à l'échelle de 1 : 1,000,000, dont les sections seraient, de préférence, limitées par des méridiens et des parallèles." The resolution goes on to say that an international commission should be appointed, with Col. Coello as President, to study the whole matter and to obtain the support of governments, societies, and private geographical establishments.

The commission on the Carte du Monde, as we call it now, consisted of twenty members, almost all very well known, such as Richthofen, Supan, Penck, Schrader, Walker, Wilson, Ravenstein, Keltie, Powell, and Ferrero. The preparatory committee had considered the question of the projection and had stated, by its chairman, that it would probably be the polyconic. This was the only suggestion made by the committee in question, other decisions being left to the future. The International Map of the World was thus born with its projection.

A special meeting was devoted to the discussion of geographical education, and at this meeting Dr. Scott Keltie described the state of this branch of learning in England ; he began by stating that the R.G.S. had been the prime mover in the reform of geographical education in this country. He went on to say that in comparing teaching methods in the different countries of Europe, he found that Germany was the country in which geography was on the most satisfactory footing, and he adopted as his profession of faith the conception of the subject worked out by Ritter, Peschel, and Ratzel. Thus " Geography as a whole is regarded as that department of knowledge which studies the varied features of the Earth's surface as the environment of mankind ; the reaction between the two giving rise to some of the greatest results of human activity." He further said that he found that throughout Europe the best teachers took German methods of teaching geography as their model.

A session was spent in the discussion of the spelling of place-names, and a resolution was passed, of which the most important part was the recommendation that the system adopted by the Geographical Society of Paris should be accepted for the writing of names of countries —such as native regions in Africa—which have no writing.

Admiral Sir Erasmus Ommanney gave a useful account of the progress of Antarctic Exploration, and put forward a resolution, which was adopted, that it was desirable that geographical societies should do all that they could to encourage antarctic exploration. There were more discussions without anything much coming of them, about the initial meridian and the universal hour.

The Congress was well attended by geographers of standing; in addition to those already mentioned, may be noted the names of Cordier, de Vasconcellos, Brückner, de Claparède, Lóczy, Forel, Ricchieri, Partsch, Holdich, and many others. There were about 500 members, and of these about 200 were Swiss.

The Sixth Congress, that of London in 1895, was a larger affair than any of its predecessors. No fewer than 1553 geographers paid their subscriptions to the Congress, and more than 400 foreign geographers attended. The Congress was under the patronage of Queen Victoria and of the Prince of Wales. The Duke of York (His present Majesty the King) opened the Congress on July 26; it was closed on August 3. The Congress was presided over by Mr. Clements Markham, President of the R.G.S. The Chairman of the Organizing Committee was Major Leonard Darwin; the Secretaries of the Congress were Mr. Keltie and Dr. H. R. Mill.

The Congress was divided into eight groups, as follows: Mathematical Geography, including Geodesy; Physical Geography; Cartography and Topography; Exploration; Descriptive Geography; Orthography of Place-Names; History of Geography; Applied Geography, with especial reference to History, Commerce, Colonization; Education. The division is, in some respects, a curious one.

Markham in his opening address indicated what were to be the chief subjects to engage the attention of the assembled geographers. These were briefly, first, geographical education; and, in regard to this, Markham said, "The authorities of the universities of Great Britain are not even aware that geography is a distinct branch of human knowledge, a science in itself. Practically they deny that it is an independent subject of study, and merely treat it, when it receives any attention at all from them, as subsidiary to history or some other recognized subject." He then dealt with the systematic surveying of Africa; with the idea of Elisée Reclus for the construction of a globe on the scale of 1 : 100,000; and with the 1 : 1,000,000 Map of the World. An important part of his address concerned arctic and antarctic exploration. And he mentioned the value of the comparative study of the past topography with that of the present, giving as an instance of this sort of study, the paper which won for M. Manet the gold medal

of the Paris Geographical Society, on the changes which have occurred since Roman times in the Bay of Mont Saint Michel. This sort of study may by some be thought to have been rather neglected in recent years.

The record shows some excellent papers. There is one by Captain Hills describing his adaptation of the methods of Runge and of Schlichter of determining longitude by photographing the moon and star trails on the same plate. Schlichter himself spoke in the discussion. The method—an interesting one in itself, which the writer has tried in somewhat unfavourable conditions on the West Coast—is now obsolete. There was a discussion on the subject so often before a Congress, namely that of hour zones. Herr von Hesse-Wartegg was able to say that the system had already been adopted by most of the states of Europe, by North America, and Japan. He mentioned that yet another initial meridian had been brought forward, and remarked, "Enterrons ce projet par un enterrement de première classe, et restons-en au méridien de Greenwich."

The Report on the International Map of the World was presented by Brückner, the President of that Commission, which had been appointed at Berne in 1891. The report and discussion occupy a good many pages, but constitute a valuable record. The main recommendations were perfectly simple and practical; they were approved by the Congress. Briefly, the foundations of the project were well and truly laid, and the few simple rules then formulated have not been altered by succeeding congresses and conferences, though they naturally required expansion. The most difficult corner was turned when the British representatives accepted the metre for the map, and the French, in return, accepted the Greenwich meridian. There was a resolution proposed by Dr. Ricchieri and Mr. Chisholm on the vexed question of Geographical Orthography, which was passed by the Congress in this form: "That the various Geographical Societies be requested to study the question of arriving at some agreement as to the writing of foreign names, and to prepare reports for the next Congress."

The Congress passed an excellent resolution to the effect that all geographical maps should bear the date of their completion. Throughout, the work of this Congress was of a very practical order; extravagant schemes were definitely turned down; five resolutions of this kind were voted upon and rejected. As to the decimal division of time and angles, which made its appearance again, this was shelved for consideration by the next Congress; the principal Geographical Societies being asked to consider and report.

There were many good papers of general interest. Sir John Kirk discussed the extent to which Tropical Africa might be suited for development by white races; Penck read a paper on the Morphology of the Earth's Surface; Bryant on the most northern Eskimos; Baron Nordenskiöld on the Early History of Charts and Sailing Directions; Buchanan gave a valuable Retrospect of Oceanography: excellent mixed fare. Practically every important British geographer was present; and

of foreigners we may mention the names of du Chaillu, Prince Roland Bonaparte, Vambéry, Penck, Ricchieri, Garnier, Grandidier, de Lapparent, Struve, Rockhill, and Greely.

The Seventh Congress was held in Berlin, and was very well attended, those actually present numbering 1500 persons. Of these 272 were foreigners and the rest Germans. The largest foreign representation was that from the British Isles. The Congress was opened on 28 September 1899 by Prince Albrecht of Prussia, and was brought to an end on October 4. The President was Richthofen.

The subject was divided into seven Groups, as follows: Mathematical Geography, Geodesy, Cartography, Geophysics; Physical Geography, including Oceanography; Biogeography, the Geography of Plants and Animals; Anthropogeography; Explorations and Travels; Historical Geography; Methodology, Education, Bibliography and the Orthography of Geographical Names. No questionnaire was circulated before the opening of the Congress.

The report of the sectional discussions discloses a great variety of subjects: the report is, indeed, nearly 1000 pages long. A good deal of the work of the First Group would now be dealt with by the Geodetic and Geophysical Union. But there was much in other groups of present-day interest to geographers. There was, for instance, a special conference on glaciers; oceanography occupied an important place, and amongst the papers on this subject was one by Dr. H. R. Mill on the Nomenclature of Sub-Oceanic Forms; there was a similar paper by Professor Krümmel. In the fourth group Dr. Keltie read a paper on the means of obtaining population statistics of uncivilized countries. In the same group Poultney Bigelow read a suggestive account of colonial administration in different parts of the world; Ratzel gave a paper on the origin of the Aryans from a geographical point of view; Leclercq described the ruins of Anuradapura in Ceylon; von Luschan gave an account of the old trade relations of Benin; Vidal de la Blache discussed "L'habitation sur les Plateaux limoneux du Nord de la France." The other groups were equally well provided with good material. Thus, Sir Clements Markham and Professor von Drygalski described the work before the British and German Antarctic expeditions then about to be sent out; Markham rejoiced that the countrymen of Humboldt, Ritter, Kiepert, Richthofen, and Neumayer should combine in the work of exploration with the countrymen of Banks, Rennell, Murchison, and Sabine. Von Sieglin, in the Historical Group, read a long account of the history of the discovery of England in Antiquity.

The old question of the division of time and angles cropped up again; the Congress voted that it was desirable to retain the existing division of time, and also that of the circle into 360 degrees, but offered no objection to the decimal division of the degree when that might appear useful. The question of the transcription of place-names was shelved by referring it to the next congress. The Congress recom-

mended the foundation of an International Cartographic Association —an idea which came to nothing in that form.

With regard to the International Map of the World, the Bureau of the London Congress of 1895 reported that it found it quite impossible to carry on the work of the Commission. It made some ineffective recommendations and exemplified the characteristic defect of congresses, namely, that whilst such bodies can conduct excellent discussions, and can frame admirable resolutions, and serve in many ways to ventilate a subject, they cannot get things done—or perhaps it would be fairer to say that in those days they could not get things done. The Congress, however, passed a resolution in favour of the production of the map, and charged the Executive Committee of the Berlin Congress with the duty of taking preliminary steps.

For the Eighth Congress we have to cross the Atlantic. This was a peripatetic congress which visited several American cities and held meetings in each. It opened in Washington, and visited in turn Philadelphia, New York, and Chicago, the final sessions being held in St. Louis. The Congress was opened on 8 September 1904, and came to an end on the 22nd of the same month. The President was Commander Peary. The Congress was not formally divided into sections, but in the preliminary announcements there was a list of nine classes into which contributions might be arranged; these were: Physical Geography; Mathematical Geography; Biogeography; Anthropogeography; Explorations and Surveys; Cartography and Bibliography; Commercial Geography; History of Geography; Education. There was no exhibition. The actual number of those attending the Congress was 455: of those who attended, 336 were from the United States and 119 came from other countries.

Amongst the resolutions adopted by this Congress was one which recommended to the Government of the United States the execution of a general map of America on the International scale of 1 : 1,000,000, the parallels to be 4 degrees apart, the meridians 6 degrees apart, the initial meridian to be that of Greenwich, and the standard of measures the metre. The Service Géographique, the Landesaufnahme, and the Intelligence Division of the British War office were thanked for the progress made in the publication of sheets of this map. Penck gave a report on the progress of the scheme.

A resolution was passed in favour of the use of local geographical names, wherever this might be possible: another in favour of the metric system; another in favour of the systematic exploration of the Arctic regions.

The Congress voted in favour of the "Universal adoption of the meridian of Greenwich as the basis of all systems of standard time." The question of the formation of a suggested Cartographical Association, which had been pressed by Schrader and Shokalski, was put aside until the next congress.

Amongst the papers read was an important one on the Complications

of the Geographical Cycle by W. M. Davis. There were a good many papers on Climatology. There was an appeal by Boulenger for a freer use of balloons by geographers. Lallemand discussed, with approval, Green's Tetrahedral Theory, originally propounded in 1875. Fewkes, of the Bureau of American Ethnology, read a paper on Climate and Cult, similarities of climate being regarded as an adequate explanation of many resemblances in cults. Mrs. Fanny Bullock Workman and Dr. Hunter Workman gave accounts of their climbs in the Himalayas. Kozui Hongwanji of Kyoto read a learned paper, based on ancient Chinese texts, on the Kuen-Lun Mountains, summing up to the effect that the name Kuen-Lun should be entirely excluded from the maps of the present day, as it is invariably misapplied in the Western World; but in spite of this appeal, the name still persists twenty-four years later.

Amongst those attending were Peary, Walcott, Cordier, Oberhummer, de Claparède, Schrader, W. M. Davis, Penck, Arctowski, Bauer, H. R. Mill, Lindgren, Hamilton Rice, and Miss Semple.

The report of the Congress ends with an Appreciation of Friedrich Ratzel, who died shortly before the opening of the Congress, by Dr. Martha Krug Genthe. Ratzel, who was Professor of Geography at Leipzig, will ever be counted as one of the leaders in the domain of Anthropogeography. the study of the influence of his environment upon man, " the story of our race viewed in the light of geography."

The Ninth Congress, which was held at Geneva, was actually attended by about 600 geographers, according to the official report. Of these about 370 were foreigners. The Congress lasted from July 27 to August 6 inclusive. The President was M. de Claparède, President of the Society of Geography of Geneva. M. de Claparède, in the Preface to the report, cites as the most important result of the Congress the new step taken to advance the execution of the International Map. This will be dealt with later.

The Congress was divided into no fewer than fourteen Sections: Mathematical Geography and Cartography; Physical Geography; Vulcanology and Seismology; Glaciers; Hydrography; Oceanography; Meteorology; Climatology and Terrestrial Magnetism; Biological Geography; Anthropology and Ethnography; Economic and Social Geography; Explorations; Teaching of Geography; Historical Geography; and Rules and Nomenclature.

One hundred and ninety papers were presented, of which 23 were read in general sessions, and 167 were read in the meetings of the sections—an average of 12 per section. Twenty-one general resolutions were passed by the Congress. So much for the statistics.

In the general assembly of delegates our old friend the decimal division of the quadrant made its appearance again, and was heavily defeated. A resolution was passed advocating the systematic exploration of the Polar Regions; another on the use of Hour Zones; another on the desirability of maps showing their mean scale; another on the

use of wireless telegraphy for fixing longitudes ; another on the study of Glaciers ; others on the oceanographical exploration of the Atlantic, of the Mediterranean, the transcription of geographical names, and so on. There was a curious little resolution on the subject of the denomination of the Lake of Geneva. It was pointed out that the expression " lac Leman " is really a pleonasm, but it was agreed that the two names Lake Leman and Lake Geneva should both be used on maps in future.

In the work of the Sections there was much of interest ; the section devoted to Explorations has a hundred pages on this subject alone, and these include an account of the Peary Club and the then state of Peary's Arctic journeys. Bruce gave an account of the Scottish exploration in Prince Charles Foreland, and Baron Hulot the state of French explorations in Africa. Harfeld described the geography of Hunan.

But, in the opinion of the President of the Congress, and in that of many other members of the Congress, the most important work carried out during its deliberations was the advancement of the International Map by a definite and considerable stage in its history. Briefly, what happened was this : Shortly after the arrival of the members at Geneva, Dr. Keltie told the British delegates that he had heard from the American representatives that they had arrived with a proposal to standardize the map. The British delegates thought this an excellent idea, and with a view to hammering out some definite proposals, they invited those likely to be interested to a little dinner. The guests included, so far as I can remember, Penck, W. M. Davis, Schrader, Shokalski, and others ; and of the British there were Keltie, Watson, Bartholomew, and Crosthwait. A general understanding was arrived at, and the matter was brought up before the general meeting of the Congress on 28 July 1908, in the names of Penck and of Mr. H. Gannet, of the Geological Survey, U.S.A. The meeting appointed a small committee consisting of Penck, Close, W. M. Davis, Schrader, and Shokalski, to meet during the Congress and submit resolutions to the final meeting. This small committee met happily and appropriately during a trip on the Lake of Geneva, on board the *General Dufour*, and got out a series of nine propositions, with regard to the construction of the Map. These propositions, which formed the basis of all subsequent official resolutions, were adopted unanimously by the Congress at a general meeting held on August 3. The representative of the British War Office informed the meeting that the British Government would be approached, with a view to the calling of an official conference in London, so that the matter might be put upon a regular official footing. This was afterwards done, and the official Conference met in the Foreign Office in London in November 1909.

One other rather outstanding matter deserves mention. An important committee wrote a pronouncement on Geography considered as a branch of Education. Amongst those who signed the pronouncement were Flahault, Ricchieri, W. M. Davis, de Claparède, Brunhes, Chodat, Brückner, and Penck. It reads thus : " La géographie, en tant que

branche d'enseignement, a pour objet la description de la surface de la Terre, considerée dans les éléments divers, physiques et vivants, dont la combinaison et l'enchaînement déterminent la physionomie actuelle du globe. Cet enseignement dans l'instruction primaire et secondaire, doit être fondé sur la lecture des cartes et suivre surtout la méthode synthétique. Dans le tableau qu'elle trace des différentes parties du globe, la géographie doit tendre en première ligne à mettre en évidence les relations entre le monde inorganique et les êtres vivants, et plus particulièrement entre la surface de la Terre et l'homme."

And now we come to the last of the old series of Congresses, namely the tenth, which took place at Rome in 1913, from March 26 to April 3. The Marquis Cappelli, President of the Royal Geographical Society of Italy, presided over the Congress. Three hundred and five members actually attended, and there were in addition 100 associate members present, a total of 405.

The Congress was divided into eight sections: Mathematical Geography; Physical Geography; Biogeography; Anthropogeography and Ethnography; Economic Geography; Chorography (*i.e.* Topography); Historical Geography and the History of Geography; Methodology and Didactics. Amongst those present may be noted the names of Otto Nordenskjöld, Loczy, Lallemand, Shokalski, Bourgeois, Gortani, Oberhummer, Blondel, Vidal de la Blache, Penck, Helbronner, Supan, Wagner, Ricchieri, Chisholm, Roncagli, Haardt, Cvijić, Bruce, Stefansson, Biasutti, Bertacchi, Marini, de Margerie.

Between the dates of the Congresses at Geneva and Rome, two important events had happened in the geographical world: the International Conference on the Map of the World had met in London in November 1913; and Peary had reached the North Pole on April 7 of the same year. Peary was present at the Rome Congress, and was perhaps the most interesting figure there—certainly the one that attracted the most attention. An account of Peary's life and work was read before the Congress by H. L. Bridgman, and from this it appears that Peary started his active life as a land surveyor, and then for two or three years was employed as a draftsman on the Coast and Geodetic Survey, and then became a civil engineer in the navy. His first expedition in Polar regions was in 1886, when he traversed 120 miles of the ice-cap of North Greenland. T. H. Hubbard discussed Peary's latitude determinations.

As to the International Map, the London Conference of 1909, at which were represented Austria-Hungary, France, Germany, Great Britain, Italy, Russia, Spain, and the United States, laid down complete rules for its execution. These rules met with general acceptance, though of course on points of detail some differences of opinion were to be found. At this Rome Congress it was felt that the stage had been reached at which it would be wise to hold a larger conference, which all civilized nations might attend; so it was decided in principle to arrange to approach the French Government to hold such a conference

in Paris. The Congress passed a resolution to that effect. The conference in question took place in Paris in December 1913, and thirty-five countries were represented. The Map was then definitely standardized, and any future changes should only be in matters of small detail.

Altogether eleven resolutions were passed in general session, and amongst these we may note the resolution in favour of an international aeronautical map; another recommending the exploration of the Atlantic; another proposed a World Union of Geographical Societies. This might have happened but for the War; the actual International Geographical Union is cast in a different mould. Another recommended that steps should be taken towards the unification of geographical nomenclature. Seven resolutions out of the eleven had to do with maps or mapping.

The Sections were provided with the usual excellent mixed fare, in which there was nothing very outstanding, but much of interest.

One remark, which applies especially to this Congress at Rome, but also to a considerable degree to the other Congresses, will come into the minds of all who were there. And that is that many of the congressists had never been in the city before, and went there, at least partly, because they wished to see it; and even those who knew Rome fairly well could not resist the temptation of prowling about the city when they should have been attending to the affairs of the Congress. In fact, Rome was irresistible, and the private duty of seeing Rome often overcame the public duty of taking part in the discussions. This must always happen, in some degree, when the meeting is held in one of the really interesting cities of the world. It damages the proceedings a little at the time, but the congressist goes home with the most agreeable memories.

The next Geographical Congress took place at Cairo from the 1st to the 9th April 1925. It was preceded by a three days' stay at Alexandria, during which the members of the Congress visited the museums of that city and spent a few hours at Aboukir.

The Cairo Congress was arranged by the Egyptian authorities so as to coincide with the celebration of the fiftieth anniversary of the foundation of the Royal Geographical Society of Egypt. The Congress did not have an easy birth; circumstances prevented its direct derivation from the Congress of Rome, its immediate predecessor. After the conclusion of the War, in 1919, the International Research Council had been founded—too soon, as many think—and this Council, with the approval of the Governments concerned, took charge of all international scientific unions, as far as these were organized under the principal academies or by the governments. The International Research Council had excluded from participation in its organization, or in that of its constituent unions, any of the "Central Powers," namely, Germany, Austria, Hungary, Bulgaria, and Turkey, and it was not possible for any of the countries which had adhered to the

International Geographical Union to take part in any congress which received delegates from those countries. The Congress of Cairo was thus, through no fault of its organizers, deprived of the possibility of being thoroughly international. It may be added that the opinion of the Council of the Royal Geographical Society had been originally against the formation of the Geographical Union under the Research Council when this was first proposed, but modified its view in 1922. The situation is still not perfectly clear, though the International Research Council, in July 1925, rescinded its regulation against the admission of the "Central Powers." It is a pity that this was not done before. Now, however, all countries belonging to the original list, and all countries adhering to the League of Nations, can join the International Research Council and any of the Unions working under the Council.

The Cairo Congress was under the patronage of H.M. King Fuad, who opened the Congress on April 1. The President was General Vacchelli, President of the International Geographical Union.

It had originally been intended to divide the work of the Congress amongst eight sections, but after discussion, and to suit local conditions, it was decided that five sections would be sufficient. These were Mathematical Geography, Geodesy, and Cartography; Physical Geography; Biological Geography and Human Geography; Anthropology and Ethnography; History of Geography and Historical Geography. One hundred and forty-two papers were presented, giving an average per section of twenty-eight.

Ten resolutions were voted unanimously, in general session. The most important of these resolutions are: The various questions of detail relating to the International Map, which have been raised by the Central Bureau, should be brought up before the Congress of 1928, having been previously discussed, with the countries concerned, by the Bureau. The Congress voted that a commission should be appointed by the Union to discuss and report upon the question of Habitat Rural, and that the report should come before the next congress. The Congress supported a proposition for the scientific exploration of the Red Sea.

The number of "inscriptions" amounted to about 220 from Egypt and about 470 from abroad, but a large proportion of the latter were institutional, and many adherents did not actually come to the Congress. The largest number attending a general session was 238. The effective strength of the Congress may, perhaps, be reckoned as about 350, or thereabouts.

Of the papers presented to the Congress some of the more interesting were: The geographical work of Franz Schrader, by Emm. de Margerie; The Use of the Range-finder in Surveying, by Little and Clayton; Researches on climatic variations, by Arctowski; Internal drainage areas, by de Martonne; Radioactivity and Geography, by Joly; and a valuable group of communications with reference to Egypt, such as Recent Surveys in the Egyptian Deserts, by J. Ball; Hassanein Bey's

account of a journey across the Libyan Desert; An account of irrigation in Egypt, by Buckley; The acclimatization of new plants in Egypt, by Mohammed Drar; The fertility of Egypt, by Mosséri; The Oasis of El-Baharieh, by Sidarous; The Routes to the Monastery of St. Catherine of Sinai, by Iscarous; The Geographical and Geological Characteristics of Cairo, by W. F. Hume; A scientific study of scenery in Sinai, by H. Sadek.

A very excellent feature of the organization of this Congress was that the well-printed and well-illustrated Report on the Congress, in four volumes, was published within a year of the closing of the Congress.

Conclusion.—The foregoing study of International Geographical Congresses may serve to bring out the opinions of the principal geographers of the last fifty-seven years as to the " content " of geography. It will have been noticed that in recent years the field of the subject has been somewhat narrowed; but in every congress during the whole period we shall have found that the subject has had for its main divisions, Mathematical Geography, Cartography and Surveys; then Physical Geography; then Biological Geography, with special reference to Plants and Animals; then Human Geography and Ethnography; then Historical Geography. The sections that have, as a rule, had the largest number of communications and have attracted the largest audiences, have been the first two on the above list, that is, Mathematical Geography and Physical Geography. As to the resolutions of these congresses, a very large proportion of them were concerned with maps, in one aspect or another. One can hardly help feeling that the map is the essential foundation upon which geography is built.

Like all congresses, those of geography have the outstanding purpose of bringing into personal communication those who are interested in the same group of studies; that, indeed, may be looked upon as the best result of any congress. But congresses also provide a means of ventilating and bringing to general notice matters, whether practical or theoretical, that are of general interest and value to mankind. Examples of such matters are the questions of the standard meridian, that of hour zones, and the international map of the world, the exploration of the polar regions, the exploration of the oceans, the mapping of unknown Asia, Africa, and South America, the effect of environment on the human race—a matter with regard to which very little is yet really known—migrations, and the many problems of human geography. The list could be indefinitely extended, but the general aim is clear. By travel, by exploration, by the apparatus of maps, by detailed investigations, by the study of historical records, to learn all we can about the Earth, considered especially in its aspect as the home of man.

THE CAMBRIDGE EXPEDITION TO EDGE ISLAND: *A paper read at the Meeting of the Society, 20 Feb. 1928, by*

H. G. WATKINS

EDGE ISLAND lies just east of Spitsbergen, separated from the mainland by Stor Fjord. The Gulf Stream, which keeps the west coast of Spitsbergen open for a great part of the year, has hardly any effect on the lands to the east of this fjord; consequently these lands differ in many ways from Spitsbergen mainland. They are more bleak, they have less animal and vegetable life, and they are scenically duller than Spitsbergen. Add to this the fact that bad gales and bad fogs are common on and around Edge Island, and you will have a picture of a land which has few comforts or attractions with which to beguile the explorer. It is for these reasons, coupled with the fact that it is sometimes impossible to enter Stor Fjord owing to the ice, that Edge Island has been so neglected.

The existing maps of Edge Island have been compiled from details supplied by the early whaling and sealing ships and also from the work of one or two expeditions such as Von Heuglin's in 1870 and Lamont's in the later half of the nineteenth century. These maps were known to be incorrect in many places and unreliable. The only really good survey work done on Edge Island was that of the Russo-Swedish Arc of Meridian expeditions. These expeditions made an accurate map of the west coast from Cape Lee to Whales Point, extending inland for about 5 miles along this line, but they did not in any way touch the rest of the island. The object of our expedition was to complete the exploration of Edge Island. That is to say, to map the entire island if possible and to study its geology, botany, and zoology. An important part of our programme was to find out the extent of the ice-cap, if such an ice-cap was found to exist. This seemed doubtful, as reports from various sources seemed to contradict one another. Up to the time of our expedition no journey to the interior had been recorded, and it was hoped therefore that during our stay we should be able to make several journeys across the interior of the island.

The expedition consisted of the following members: Major H. T. Morshead, D.S.O., Survey of India (surveyor); N. L. Falcon (geologist), formerly of Trinity College, Cambridge; H. M. Woodman (doctor), formerly of Pembroke; A. G. Lowndes (biologist), formerly of St. Catherine's; R. v.d. R. Woolley (physicist), Caius; V. S. Forbes (assistant surveyor), Christ's; C. T. Dalgety (ornithologist), Trinity; A. G. Michelmore (land biologist and botanist), Trinity; and H. G. Watkins, Trinity.

Two very welcome grants in aid of our funds were received: one of £100 from the Royal Geographical Society, who also lent instruments; and one of £150 from the Worts Fund of Cambridge University. Without these grants the expedition would have been exceedingly hard pressed for money. Plane-tables and a panoramic camera were lent by Mr. Debenham, and a panoramic camera was lent by Mr. Wordie. Mr. Wordie also lent a great deal of equipment.

The expedition assembled in Tromsö in the middle of July. The journey thus far had been uninteresting, as the mail steamer from Bergen to Tromsö

does not enter any of the large fjords. At Tromsö the work of getting stores on board our ship was immediately begun, and by July 22 everything was ready. The expedition's ship was the motor sealing ship *Heimen*, owned by the Jakobsen brothers of Tromsö and skippered by Lars Jakobsen himself. An excellent crew had been picked by Jakobsen and Capt. Ove Hoegh, the expedition's agent in Tromsö. This crew and the ship proved thoroughly satisfactory throughout the voyage.

On July 23 we left Tromsö and within twelve hours were in the open sea on a course set for Edge Island. The weather was rough, and at the outset both our patent log and wireless aerial were carried away. Unfortunately, in the rush before departure one of Woolley's magnetic instruments had been stowed too close to the ship's compass, and consequently we were unknowingly steering a course too much to the east, so that on July 26, when we first sighted ice blink, we were actually some distance north-east of Bear Island, whereas we were under the impression that we were well to the west of it. We had been unable to fix our position by the sun, as it had been obscured since our departure from Tromsö.

For the next few days we had continued fogs and also difficulty in getting through the ice, and the monotony of these days was only broken by an occasional polar-bear hunt. We shot four of these animals, and thus laid in a good supply of fresh meat. The first bears we saw caused us a good deal of excitement. There was a mother and two cubs. The mother and one cub were shot from the bows of the *Heimen ;* the other cub climbed out on to an ice-floe and, after running across it, did a brilliant dive into the water the other side.

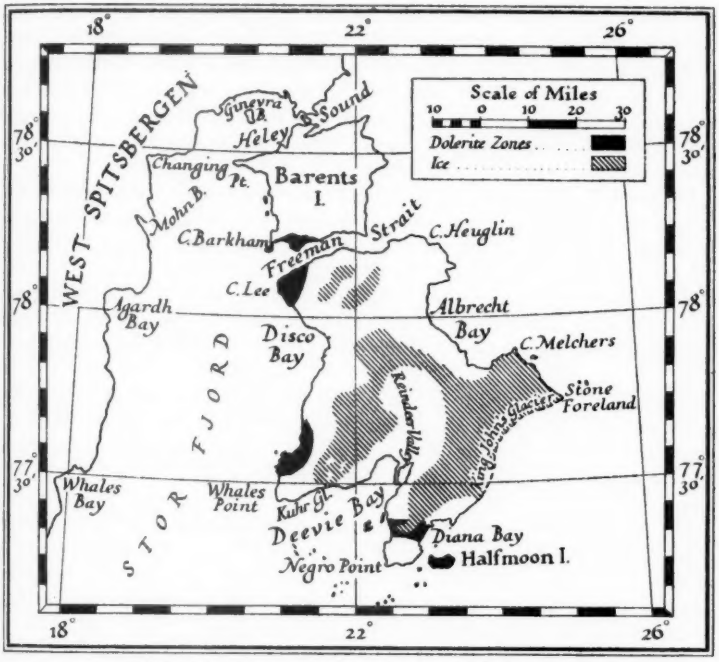
A boat was immediately lowered and set off in pursuit. The cub was soon overtaken, lassoed, and towed back to the *Heimen*. Then came the problem what to do with him. He was a big cub, and there was nothing strong enough to hold him on the ship. But it seemed a pity to shoot him, as his skin was not really big enough to be of much use. Eventually we decided to let him go, hoping that he was old enough to look after himself. It was impossible to undo the rope round his neck as he was extremely fierce. So we had to cut it as near to his head as possible. and he went off looking like a large dog which had escaped with its lead.

Polar-bear hunting under these conditions is not a good sport. Once the bears get in the water they can easily be overtaken by a rowing-boat, and consequently they do not stand a chance. They can sometimes escape if it is misty or if the ice is tightly packed so that they can run away. If a ship is beset in the ice the sailors often boil blubber on deck, and this attracts the bears to the ship, where they are shot.

On July 28 we were able for the first time to get sight of the sun and fix our position. This caused us some surprise, as we found we were some distance east of Edge Island. The matter of the faulty compass was soon set right, and we turned our course westward, so as to pass through Freeman Strait, which separates Edge Island from Barents Island. On the morning of July 30 we sighted both these islands, and were soon passing through the Strait. Our object was to reach Whales Point, the southern extremity of the strip surveyed by the Russian Expedition. To do this we had to sail

southwards through Stor Fjord, and this afforded us a good opportunity of comparing the scenery of Edge Island and Spitsbergen.

To the west lay Spitsbergen, a mass of jagged peaks and large glaciers running down into the sea; in fact, the Alps brought down to sea-level. To the east lay Edge Island with its long dark cliffs and tabular hills. These flat-topped hills are a typical feature of Edge Island. The strata are horizontal, and it is possible to follow the same bed, at the same height above sea-level, from the southern half of Edge Island right into Barents Island with no change in lithology. Numbers of dolerite sills form a noticeable feature of the Edge Island coast, and it can be seen that these sills



Edge Island: extent of ice-cap and dolerite zones

frequently migrate from bedding plane to bedding plane. Unlike Spitsbergen, there was little snow visible on Edge Island except for one or two shining snow domes to the south. And nowhere could there be seen a glacier that reached the sea on this side of the island.

At 1 a.m. on July 31 we dropped anchor at the spot marked Keilhau Bay on the Admiralty Charts; on these charts this bay is shown as a deep bite out of the land marked by dotted lines. We found that this bay was almost non-existent, as the coast hardly trends inward at this point. However there is a small hut there, built years ago by a party of wintering hunters, and we

decided to make use of this. A surveying party under Morshead immediately set out for Whales Point to pick up the triangulation points left by the Russians, and survey back to Keilhau Bay. Falcon, the geologist, accompanied this party to collect fossils and begin his study of the succession of the Triassic rocks of the west coast of the island.

Meanwhile a reconnaissance party consisting of Woodman and myself set off up a valley from the bay to try and get a view of the interior of the island and find out if it was suitable for sledging, or if it would be necessary to carry all our loads. We soon found that the country between Keilhau Bay and the interior ice would be impossible for a party laden with sledges and stores. The ground was composed of mud with stones on the top, and everywhere could be seen the familiar mud polygons. Although hard on the surface it was soft underneath, and every step meant infinite labour, and under these conditions sledges and heavy cases would have been an impossible burden. There were numerous other obstacles in this valley in the form of canyons cut out by streams coming down from the ice-cap and from the sides of the valley. Some of these were 250 feet deep, with sides almost vertical. On these sides thousands of gulls were nesting.

On reaching the ice we climbed to the top of a rounded snow dome, and from here obtained our first view of the interior, which consisted as far as we could see of huge rolling snow domes with very gentle curves, all of them cut up from top to bottom with small troughs formed by streams. This view of the island made us feel that sledging would be possible, though difficult. From this snow dome we could see an obvious way for the sledges on to the ice-cap, viâ the Kuhr glacier, which descends to the coast farther up Deevie Bay.

After this we returned to the ship, and almost immediately the surveying party arrived, very tired after their first day's work, not having slept for thirty-six hours. Leaving Falcon, Dalgety, and Michelmore at Keilhau Bay to study the geology, ornithology, and botany, we moved up Deevie Bay to the Kuhr glacier.

On August 1 the sledging party landed on the shore below Kuhr glacier, with the object of crossing the island to the east coast, and returning by a slightly different route, carrying out by means of short détours a survey of the whole of the southern part of the island. The sledging party consisted of Morshead, Woolley, Forbes, Woodman, and myself.

Before sledging could start it was necessary to carry the sledges and stores over a wide maritime plain, and then over the moraine of the Kuhr glacier. The plain, which is a raised beach, was about $1\frac{1}{2}$ miles wide, and formed a good surface for walking on ; it was strewn with driftwood. The moraine itself was in the form of small hills, and where the glacial streams ran on to it near the glacier it was a mass of sticky mud, making it extremely difficult for us to pass with our heavy loads. On arrival at the glacier conditions improved but little, as the surface was pure ice with no snow on it, and cut up everywhere by streams. Thus sledging was distinctly arduous, but we had hopes that when we got higher up we should be sledging on good snow.

We had with us one 11-foot sledge with a four-man harness. This harness

is made of canvas with straps over each shoulder and a strap round the waist. The fifth man had to walk beside the sledge, as it was continually overturning while crossing streams. It was found that by throwing his weight against it at the critical moment he could usually stop it upsetting. It was nevertheless an unpleasant job for the fifth man, as it entailed getting very wet at each stream.

Up to now the weather had treated us kindly, but on the evening of our first day out it broke, and a bad fog set in, lasting more or less continually for the next ten days. As no surveying could be done in fog, it was obviously useless to continue the journey across the island. We camped some distance up the glacier, just where it was beginning to merge into the ice-cap, in such a position that, if the weather cleared, a surveying party could dash up a branch of the glacier on to the ice-cap, and pick up the points which had already been surveyed above Keilhau Bay.

During these days the fog would occasionally clear for an hour or so, and a party would immediately set off, only to return without having got any work done, owing to the fog descending. At last, on August 6, Morshead and I took a small tent and provisions for two days up on to the ice-cap, and pitched our tent on a small patch of moraine in a rather exposed position. We hoped in this way to be on the spot when the weather cleared, and thus to profit by every minute, and pick up the points above Keilhau Bay. During these two days we were able to get a certain amount of surveying done, enough in fact to enable the journey eastward to be started, if only the weather would remain fine. Unfortunately, we got caught by a blizzard in our exposed camp and had to remain there. Our provisions had run out, as we had stayed out longer than we had expected in order to get the surveying finished. Our tent was pitched on rather loose ground, and it was only the fact of the ground freezing hard which prevented it being blown away. Sleep was almost impossible owing to the noise of the wind. Altogether we spent a most unpleasant thirty-six hours while the blizzard lasted. An hour or two after the blizzard stopped we saw two figures coming across the ice towards us. Much to our joy they turned out to be Woodman and Woolley with food. They had got worried during the blizzard, knowing that we should have no provisions left, and so they took the first opportunity of coming up to us.

On getting back to the glacier camp we again settled down to the life of waiting for the weather to clear. The visibility was down to about 50 yards, and so it was not possible to wander far from camp without the fear of getting lost. There was nothing to do but lie in our sleeping-bags and pass the time by talking and singing, the only excitement during these days being meal-times. Our tents (Mummery pattern) were small, and it was impossible to move without disturbing the next man, and for this reason we all soon learnt the art of sleeping quietly and with straight legs.

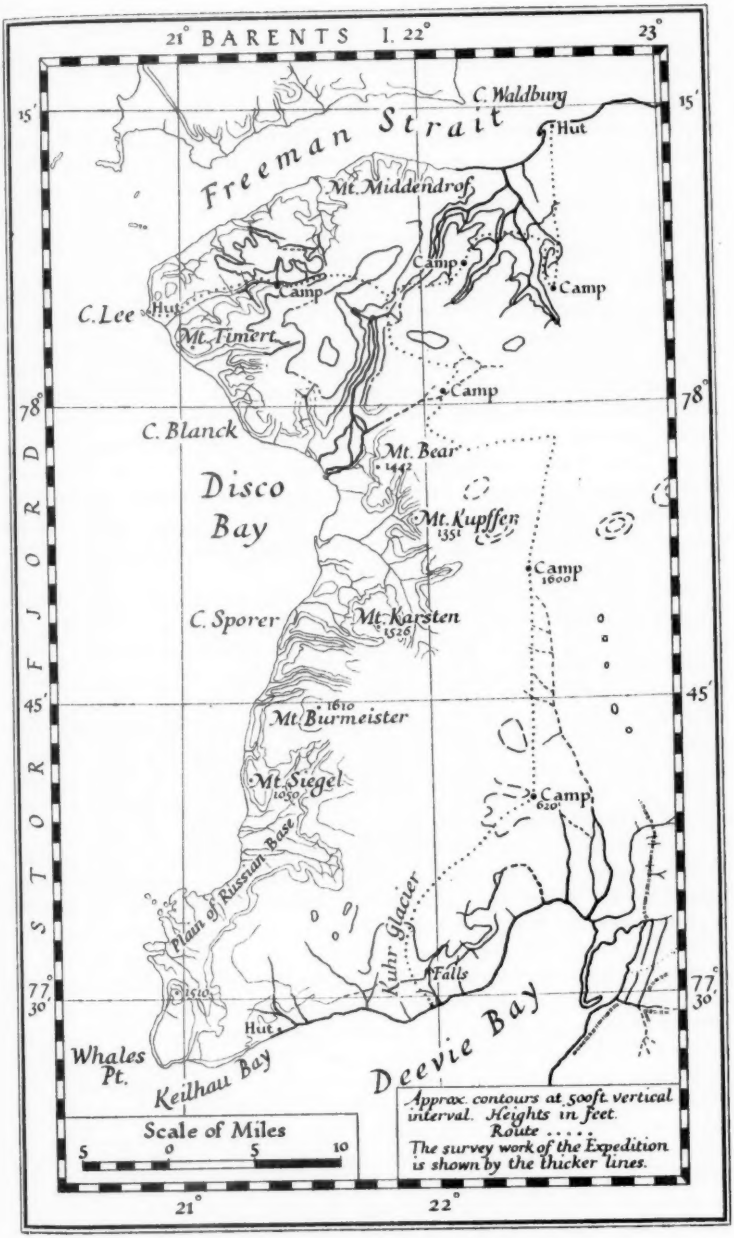
It soon became obvious that we should have to get back to the ship without having done much. During this time, with the help of one fine day, Morshead was able to map out the whole of the head of Deevie Bay, and this was almost the only work we accomplished on this journey. On August 12 we arrived back at the ship.

Though this trip had yielded small results from the surveying point of view it had afforded us an opportunity of studying the ice-cap. This is obviously disappearing very rapidly, the melting being in no way compensated for by the annual snowfall. Consequently on the whole of the ice-cap we found the surface composed of bare ice, with little or no snow on it. The surface of the ice is very dirty, being covered with a fine dust which has probably been blown up from the unglaciated portions by the powerful wind which seems to blow almost continuously on the island. In many places on the glacier we found débris cones. At first sight these appear to be mounds of débris a few feet in height, but if the débris is scraped away they are found to be cones of ice with a covering of débris on them. They are formed in the following way : If there is a mound of débris on a patch of flat ice it will prevent the sun from melting that ice. At the centre of the mound where the protective covering is thickest the ice will not melt at all. But round the edges where the covering is thinner some melting will take place, and thus a cone of ice is built up. In one place we found such a cone formed by the remains of a dead reindeer.

While the sledging journey had been in progress the ship's party had been working hard, and as their work was not so dependent on the weather they had got good results. After work at Keilhau Bay had been finished they had visited Negro Point and several of the islands near it. From there they had gone on up the west coast to the site of the old Russian base. Parties had been landed at each of these places, and between times Lowndes had used the ship for making his marine biological collection. During his study of the Triassic rocks near Kuhr glacier Falcon found reptilian remains in a very good state of preservation, and managed with great care to extract one skeleton without damaging it. The rock in which the fossil was embedded was of considerable weight, and there was great difficulty in getting it down to the ship. It was first tied to a board and this was then slung between two oars, so that it could be carried by two men. The journey to the ship was not an easy one, and at one point a cliff had to be descended. However, owing to the care of the two bearers it arrived at the ship undamaged.

While we had been away Dalgety had managed to capture an Ivory Gull. These birds are very greedy, and Dalgety succeeded in catching it by towing a piece of bear fat on a string behind the ship. This bird soon got quite tame and would feed out of our hands without getting at all frightened. Unfortunately he soon lost his pure ivory colour after a day or two on board the *Heimen*, and by the time we got back to Tromsö he looked more like a crow.

By this time it had become obvious that nothing much in the way of clear weather could be expected, and so a new plan of work had to be formed. From views which we had had of the interior of the island, we had come to the conclusion that it was entirely ice covered, and that therefore a detailed plane-table survey would be of little use. Therefore I decided to send a party, carrying their stores, across the centre of the island from Kuhr glacier to the north coast. This party would make a prismatic compass survey of the main features of their route and would finally work along to Cape Lee. Meanwhile the ship would go round to Cape Lee and leave a surveying party



The west coast of Edge Island

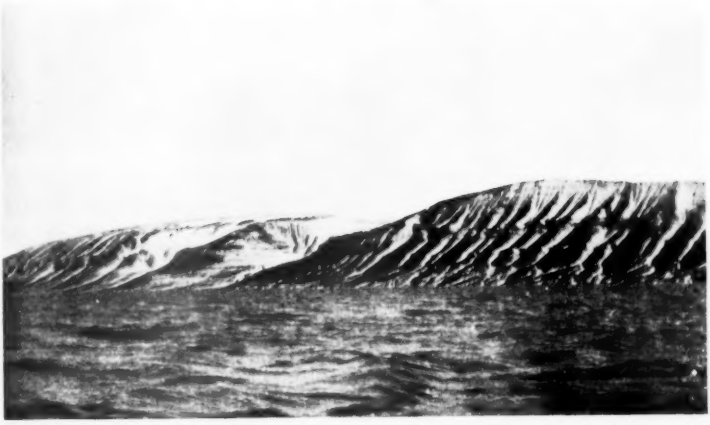
there under Morshead, who would work inland from the points already done by the Russians.

We had hoped to have a rest on the ship and a change of food for a day or two. But the moment we arrived on board the weather turned fine, and we had to start packing up provisions for the journey across the island. After twelve hours on the ship the inland party, consisting of Falcon (geologist), Forbes (who was to be responsible for the prismatic compass survey), and myself, set off, carrying our tent and provisions for eight days.

At first our route lay over the glacier we had already traversed during the sledging journey. We were lucky in finding very few crevasses on any of the glaciers which we had to cross. Instead of these we had unpleasant obstacles in the form of streams. These streams had cut down through the ice, and some of them had formed channels about 20 feet deep with vertical sides. These were impossible to cross, and it was sometimes necessary to do a détour of a mile or more to get round them. Soon we got up on to the ice-cap, and here we met with very unpleasant conditions. The surface was frozen, but just underneath there was about 12 inches of semi-frozen slush. At every step one broke through the crust and sank up to one's knees. Added to this there was a bad fog, and we had to walk strung out in a line, one behind another, in order to keep our course.

After about three hours of this kind of going we suddenly arrived upon the top of an apparently bottomless ice-cliff. This was obviously going to cause us some difficulty in the mist, but luckily almost immediately the mist lifted, and in front of us lay a wonderful sight. We were standing on the top of an ice-cliff between 200 and 300 feet in height. In front of us lay a huge snow basin 3 or 4 miles wide, surrounded by large rounded snow domes, shining in the bright sunlight. A study of the cliff showed that it was probably formed by radiation from moraine at the base. Our way down the ice-cliff was by a simple ice-fall, and then our path lay across the snow basin. At the other side of this we camped for the night.

Next day the weather was fine. To begin with, the country was much the same as formerly, but upon crossing a col at midday we suddenly found ourselves in a different world. Ahead of us was an entirely unglaciated region, consisting of a large valley, about 11 miles wide, running roughly north and south, surrounded at its head by the familiar snow domes. It obviously opened to the south-east of us, in Deevie Bay. This valley had many reindeer in it, which were very tame, not having seen man before, and allowed us to approach very close to them. We found a great many antlers on the ground, and Forbes fastened one pair to his own head and then walked on all-fours up to a herd of about fifteen reindeer. He succeeded in getting to within about 20 yards of them ; then they decided that they did not like this new addition to their herd, and they all turned round and made off at a trot. They only went about 50 yards, and we left them staring after us in a bewildered manner. This is probably the only part of the Spitsbergen archipelago where there are many reindeer left. They owe their safety to the fact that they are so far inland, and ships' hunting parties in search of food do not ever reach them. We went up this valley to its head, and up



North coast of Edge Island from Freeman Strait: after a blizzard

Glacier front on east coast of Spitsbergen mainland

Whales Head, Stor Fjord

A river above the waterfall near Kuhr Peak

Ice-cliff encountered on the journey across Edge Island

again on to the ice-cap. After this our journey was over snow dome after snow dome, until we came to the northern limit of the ice-cap.

The ice-cap ends in a series of tapering glaciers, none of which are crevassed, and all of which are obviously retiring. On these glaciers there are many débris cones. At the point where we left it the ice-cap ends rather abruptly. This is due to the fact that a deep valley runs in from the west coast in an easterly direction, and none of the glaciers from the ice-cap get across this valley.

After one day's journey on the northern unglaciated portion of the island, we fell in with Morshead's surveying party about 20 miles from Cape Lee. They had been profiting by the few fine days in making a useful survey of the north-west corner of the island. We went with them to their camp in the head of the valley leading down to Cape Lee. We had intended to go down to Cape Lee, but since we had met Morshead's party this seemed waste of time. We therefore decided to split up the parties so that Morshead, Forbes, and myself should go on to Cape Heuglin, as the weather was fine, and do a plane-table survey of the northern part of the island. Falcon went down to Cape Lee with Dalgety and Woodman, who had been in Morshead's party. They were to work there for a few days, and then take the ship round to Cape Heuglin to meet us.

On all our marches our system was to walk for twenty-five minutes and then rest for five minutes. In this way we avoided getting tired out by our heavy loads. Our daily routine was to start at about nine o'clock in the morning, and camp at about eleven o'clock at night. Our rations consisted of $\frac{1}{2}$ lb. of Bovril Pemmican, 1 lb. of plasmon biscuits, and $\frac{1}{2}$ lb. of chocolate per man per day. These we used for our three daily meals. A hot breakfast of pemmican and biscuits, a cold lunch of chocolate and biscuits, and a hot dinner of pemmican and biscuits.

For the first day of this journey the weather remained fine, but after that it broke, and very little surveying could be done. We had hoped to work across during this time, and survey the northern portion of the east coast, but this was quite impossible, and we were unable even to complete the survey of the eastern portion of the north coast. The north-east coast has an even wider maritime plain than the one in Deevie Bay, and this plain has many whale bones strewn about on it. Behind this bare hills rise up, and going still farther south one comes again to the ice.

I had arranged for the ship to meet us at Cape Heuglin at midnight on August 21. At 1 a.m. on August 22 we arrived rather exhausted at Cape Heuglin. A gale had been blowing for several hours, and we were looking forward to getting on board the ship again. To our great disappointment, when the weather cleared for a minute or two we found there was no ship in sight. We immediately cut down our rations and went to bed hungry after a very weak soup of pemmican. Next morning at nine o'clock there was still no sign of the ship, and we began to get rather worried. However, an hour or two later it hove in sight, and we were soon on board having a very welcome meal. The late arrival of the ship was due to the fact that it had run aground on the east coast of Spitsbergen. Luckily it had drifted off again fairly soon.

Ice-cliff encountered on the journey across Edge Island

A river above the waterfall near Kuhr Peak

Almost immediately after picking us up the ship had to run in under Barents Island for shelter from a bad north-east gale. For the next three days we remained there in the hope that the force of the gale would abate, and that we should be able to land at Cape Heuglin and continue the survey down the east coast. We were particularly anxious to fix Cape Heuglin accurately, as its position as shown on the Admiralty chart is almost certainly wrong. Unfortunately after three days the blizzard showed no signs of abating, and as pieces of ice began to be blown in to Freeman Strait, it was obvious the gale was bringing down large masses of drift ice. We decided to go down Stor Fjord to Negro Point in the hope of finding better weather there.

When the land party had left Kuhr glacier the ship went round and left Morshead's party at Cape Lee. After this Woolley took the ship over to the east coast of Spitsbergen and visited Mohn Bay, Whales Bay, Agardh Bay, and Changing Point on Barents Island, for magnetic work. Lowndes also remained with the ship to visit these various places and collect there. At all these places on the mainland the glaciers are very large and in most cases reach the sea. As the folding of the rocks on the mainland is intense the scenery is much grander than on Edge Island.

At one place on the west of Edge Island the ship's party found the remains of some hunters who must have died there about twenty years ago. Such accidents were unfortunately common before the proper ways of avoiding scurvy were discovered.

On arrival at Negro Point we went ashore in the hopes that work would be possible, but unfortunately the weather showed not the least sign of clearing, and the gale continued. So, after Woolley had done some magnetic work, we got all the stores on board the ship and sailed eastward along the south coast of Edge Island in order to get a view of the magnificent King John's glacier, which glacier comes down into the sea and forms a wonderful ice-cliff some 30 miles in length, running out east into Stone Foreland, the south-eastern extremity of Edge Island. This corner of the island is by far the most heavily glaciated, as, except for one or two places on the east coast, no other glaciers reach the sea. An interesting feature of the Negro Point peninsula is a valley which cuts right through it from sea to sea. From the distance the end of the peninsula appears as an island.

It was a great disappointment to us never to have been able to do anything on the east coast, as a map of this little-known area would have been extremely useful. But unfortunately it had been necessary to start our survey from the Russian points on the west coast, and owing to the weather we had never got as far as the east coast. We had had a fairly good view of it before sailing into Freeman Strait on our first day near the island. It looked heavily glaciated, and probably several of the glaciers reach the sea.

On August 26 it became obvious that the weather was not going to clear, and that we were in for a period of bad gales. At such a time it is dangerous to remain near Edge Island, as heavy ice may be brought down from the north-east and sweeping round Stone Foreland may beset one in Stor Fjord, or, if one is unlucky enough to be on the east coast at the time, one may be crushed by the force of the ice. For these reasons, and also owing to the

fact that the charter of the *Heimen* was to finish on September 2, we regretfully said good-bye to Edge Island and turned for home. Sailing first of all in a south-easterly direction in the hopes of getting some shooting on the edge of the ice, we arrived on Tromsö on September 1.

We had been away from Tromsö for six weeks, and of that time four weeks had been spent on Edge Island. Of those four weeks only five days had been fine. This naturally had been a great disappointment to us, as we had not done as much surveying as we had hoped. However, the other work such as geology, not being dependent on the weather, had proceeded satisfactorily. And although we were only able to map a small part, we were able to get a very good idea of the main features of the island and the extent of the ice-cap.

The ice-cap is roughly horseshoe in shape, surrounding the central unglaciated valley which leads down into the head of Deevie Bay. The western branch of the ice-cap runs up from Kuhr glacier and curves round the north of the central unglaciated portion of the island, and down the east coast to King John's glacier in the south-east. On the west and north coasts none of the glaciers from the ice-cap reach the sea. On the east and south coasts, large glaciers reach the sea in several places. The largest of these glaciers is the King John's glacier, which forms the greater part of the south coast of the island. While crossing the island we got several views of the east coast, and from what we could see it seems that the point called Cape Melchers consists of a large glacier running into the sea. All the glaciers which do not reach the sea are retreating, except for one near the northern limit of the ice-cap. This is passing through a period of temporary advance.

The ice-cap itself consists of large rounded snow domes, and not the long stretches of flat ice which one would expect to find. These domes are all more or less the same height, about 1500 feet. The greatest height which we recorded on one of the domes, near the centre of the island, was just over 2000 feet. Even on the highest of these domes we found little or no snow. This causes great difficulty when a tent is to be pitched. On one occasion during the crossing of the island a blizzard started; and it was found quite impossible to fix the tent-pegs in the ice. The only way we could secure the pegs was by collecting damp snow from a stream and burying each peg, and waiting till it was frozen in.

The whole island has been subjected to a gradual uplift quite recently; in fact, the uplift is probably still taking place. This has resulted in the formation of the curious canyons near Keilhau Bay, formed by the streams cutting down as the island has been raised. The finest examples of these canyons were found at Keilhau Bay, but smaller ones were found at almost every place where we landed.

If the weather which we got is typical of Edge Island, then any future expedition will do well to start their work on the east coast. They would then be able to profit by every minute of fine weather in surveying this important part of the coast. Fog is bound to occur frequently in Edge Island owing to its position. It also seems probable that north-easterly gales are frequent, as apart from our own experiences Mr. Wordie, on his

first visit to Cape Lee in 1919, had a strong gale from the east the whole time he was there.

The position of Cape Heuglin (the north-east corner of the island) is certainly shown too far to the east on the Admiralty Charts. Unfortunately, owing to the weather we were unable to fix its position, although we waited for a considerable period in the hopes of the weather clearing.

APPENDIX I SURVEY

MAJOR H. T. MORSHEAD, D.S.O.

Although first discovered more than three centuries ago, Edge Island has remained a comparatively little-known portion of the Spitsbergen Archipelago. The main features of its coast-line have, it is true, been roughly charted as they appear from the sea, but the occasional visits to the island of hunters and trappers have failed to result in any maps or descriptions of the interior.

The only piece of accurate surveying which has been done on the island is due to the Russo-Swedish Arc of Meridian Expedition. The Russian section of this expedition visited the island during the years 1899–1901, and fixed three principal geodetic stations of observation on the west coast. They also mapped a narrow coastal strip—varying from 4 to 8 miles in width—along the west, and a portion of the north and south coasts. Their work, which is published on the scale of 1/200,000, is detailed and reliable, but it nowhere extends as far inland as the central ice-field.

It was hoped, during the expedition of 1927, to extend the survey over a considerable area of the remainder of the island, and in particular to indicate the present limits of the inland ice-cap, which appears to be in a state of rapid retreat. Plane-table sheets were accordingly projected on the scale of 1/200,000 (about $3\frac{1}{6}$ miles to an inch) before leaving England, and the Russian work was traced on to these in pencil.

Unfortunately, from the very outset work in the field was hampered by almost continual cloud and mist, so that plane-tabling only proved feasible on five days out of one month on the island. In these circumstances, the utmost that could be achieved was a small amount of mapping in the north-west of the island and an extension along the south coast as far as the head of Deevie Bay. The country is open and undulating, and readily lends itself to easy and rapid survey by the normal method of plane-tabling, and it is greatly to be regretted that adverse weather conditions should have placed such restrictions on the possible outturn of work.

The map has been lodged with the Royal Geographical Society, to whom the expedition is indebted for the loan of surveying instruments, as well as for a very welcome grant of funds. Instruments and panoramic cameras were also kindly lent by Messrs. Debenham and Wordie of Cambridge University; but, owing chiefly to the poor visibility, it was not found possible to assist the mapping by photographic methods.

APPENDIX II MAGNETIC OBSERVATIONS

R. v.d. R. WOOLLEY, M.Sc.

The instruments used by the writer were a Kew pattern unifilar magnetometer No. 161, by Dover, Charlton, and a 3-inch theodolite, the property of the R.G.S. Observations were made of latitude, longitude, azimuth, declination, and horizontal force. For the astronomical measurements only the sun

Reindeer valley: unglaciated part of Edge Island

A cone on Kuhr glacier

Glacier in north of Edge Island

Part of Kuhr glacier moraine

Glaucus canyon, near Keilhau Bay

was available during the time spent on Edge Island. The very high latitude (about 78° N.) made observations of longitude difficult and uncertain. The determination of azimuth was also troublesome. In these latitudes the magnetic field has a weak horizontal component and magnetic disturbances are large and of frequent occurrence. During some observations made by the writer the declination needle wandered considerably during the two hours during which an H.F. experiment was being conducted. Fortunately the tour of Stor Fjord was made during a period of relative calm.

The procedure adopted was to observe successively : vibration ; deflection (30 cms.) ; deflection (40 cms.) ; deflection (30 cms.) ; vibration ; the whole operation taking about two hours. The declination with reference to some local azimuth-mark was observed at intervals whenever convenient during the H.F. observation. It is hoped that in this way values of H. and declination have been obtained which represent fair average values. The instrument was not regarded as absolute, but was swung before the departure of the expedition at the Royal Observatory Magnetic station at Abinger, and compared with the standard instruments there. It should be mentioned that the instrument, stowed about 3 metres away from the ship's compass, affected the latter by about half a point.

Absolute Values of Declination and Horizontal Force

Station	*Date* 1927	*Lat. N.*	*Long. E.*	*Mag. Decl. W.*	*H.F. in c.g.s.*
Keilhau Bay ..	July 31	77° 29′	21° 21′	2° 40′	—
Deevie Bay	August 12	77° 31′	21° 56′	1° 19′	—
,, ...	,, 13	,,	,,	0° 59′	·0871
†Cape Lee	,, 14	78° 05′	20° 54′	—	$\cdot 0842_5$
,, ...	,, 18	,,	,,	—	$\cdot 0841_4$
,, ...	,, 21	,,	,,	2° 49′	—
†Whales Bay	,, 15	77° 30′	18° 37′	4° 44′	·0866
Agardh Bay	,, 16	78° 02′	18° 48′	4° 24′	·0846
Mohn Bay	,, 16	78° 17′	18° 58′	4° 26′	·0835
†Changing Point ..	,, 17	78° 29′	20° 16′	3° 21′	·0832

† Denotes a good anchorage. Agardh Bay is foul.

Diurnal Movement in Declination

The procedure adopted was to set the magnetometer vernier scale on a definite mark and observe at half-hourly intervals the reading of the scale of the suspended magnet. The complete observations are published in *Terrestrial Magnetism*, with corresponding figures read off from the traces obtained at Abinger. August 18–19 was quiet, and exhibits some correspondence between the two stations, while violent storms occurred at both stations on 20th–21st. The disturbances at Cape Lee at 7.40 a.m. on the 20th and at 8 a.m. on the 21st were remarkably large, viz. about 4° and 3° E. of the mean position respectively.

Secular Change

A determination of the value of the secular variation in H. and Dec. has been made by comparison with some Russian observations in 1898. It has been necessary to extrapolate from the 1927 result to the 1898 stations. This has been done graphically. There is considerable irregularity in the Russian observations which may be partly due to real local variations, but in the case of their Cape Lee observations the observations were rendered uncertain by a violent wind there. The Greenwich records for 1898 show that the day on

which this observation was made was disturbed magnetically, while the day of the Wijde Bay observations was heavily disturbed. The results are :

Secular Changes in Declination and Horizontal Force

Station	*Lat. N.*	*Long. E.*	*Declination West*			*Horizontal Force*		
			1898	1927	*Change*	1898	1927	*Change*
Bell Sound	77° 30′	14° 50′	12° 33′	7° 41′	−4° 52°	·0914	·0862	−52
Advent Bay	78° 15′	15° 32′	11° 11′	7° 8′	−4° 3′	·0906	·0840	−66
Skans Bay	78° 31′	16° 03′	10° 55′	6° 43′	−4° 12′	·0873	·0825	−48
Wahlberg I.	79° 19′	20° 07′	—	—	—	·0847	·0801	−46
Thumb Point	79° 04′	20° 43′	6° 51′	3° 2′	−3° 49′	·0774	·0811	+35
Wijde Bay	78° 55′	16° 17′	8° 52′	6° 31′	−(2° 21′)	·0807	·0811	(+9)
Cape Lee	78° 05′	20° 54′	4° 56′	2° 49′	−(2° 7′)	·0711	·0892	(+131)
Anderson I.	78° 20′	20° 43′	—	—	—	·0881	·0838	−43

The mean of the four Russian declination stations is 4° 14′ decrease in westerly declination in twenty-nine years, giving an annual decrease of 8·7′ per year. Rejecting Thumb Point as a local irregularity, the mean decrease in H.F. for five stations is 510γ per year, a mean annual decrease of 17γ per year.

In conclusion, I should like to express my gratitude to the Astronomer Royal and the Greenwich staff for the interest they have shown and help they have given me in connection with these observations, and to Mr. A. P. G. Michelmore for his assistance with the continuous observations at Cape Lee. My thanks are due to the Hydrographer to H.M. Navy for the loan of the magnetometer.

APPENDIX III LAND BIOLOGY OF EDGE ISLAND

A. P. G. MICHELMORE, F.E.S.

Invertebrate Zoology

On Edge Island, and at the other points visited on the coasts of Stor Fjord, collections of land invertebrates were made. The collections have not yet been worked out, but it is hoped to publish a full account later. As far as can be told at present the collections contain about thirty-five to forty species. These are distributed in the various groups as follows : Oligochæte worms about 5, about 10 Acarina (Mites), 1 Spider, about 10 Collembola (Springtails), 8 to 12 Diptera (Flies), and 1 species of Ichneumon Fly (Hymenoptera, Ichneumonidæ). The fauna is evidently very much poorer than that of the west coast of West Spitsbergen, as would be expected from the more severe climate. Except in the Diptera, most species were very abundant, and occurred in most of the stations visited. It is therefore probable that not many species were missed, in spite of the all too short time available. The Midges or Chironomidæ were the dominant group of Diptera, and several species were abundant everywhere. The others appeared to be extremely local. About seven species were found at the first camping ground, Keilhau Bay. Here, besides the Chironomidæ and an Anthomyid which occurred nearly everywhere round the coast, a Fungus Gnat and a *Trichocera* (Winter Gnat) were very abundant. These genera were found nowhere else except at Cape Lee, where two specimens of the former and one of the latter were found. It is quite likely that this was in part due to the weather, as the only perfect days were the first two at Keilhau Bay, and another at Changing Point on Barents Land. It is significant that a Mycetophilid was found in small numbers by sweeping over a small bog at the latter place. If it had not been a brilliantly sunny day without wind, it is unlikely that this species would have been found at all, as it appeared nowhere else. It is certain that the weather made a considerable difference in collecting

flies, for Chironomids were flying in immense numbers near ponds on still days, while on windy days they could only be found dancing in small numbers in such sheltering nooks as the very open country provided. It is likely, too, that the short summer causes winged insects to have a short season, so that some were missed in this way. From these considerations, the total terrestrial macroscopic invertebrate fauna of Edge Island, perhaps even including that of the very similar Barents Land, may be estimated at not exceeding seventy species. These may be distributed as follows : Oligochæte Worms 10 species, Mites 15, Spiders 1, Collembola 15, Hymenoptera 1, while Diptera may run as high as 28.

Various writers have commented on the abundance of Enchytraeid worms in the Arctic, saying that they take the place of the Lumbricid earth worms of warmer climates. This was not found to be the case in the parts visited by this expedition. Worms were rare in soil and moss, and only occurred in special, usually wet, situations. For instance, one species was found commonly with a tiny white Springtail, under the dung of a Skua (?) at the edge of a pond on the Kuhr Moraine. One kind was common under wet stones at the edges of fresh-water rock pools close to the sea at Whales Bay, West Spitsbergen. One was common under stones below high-tide mark in the little cove on the south side of Cape Lee, while another was in swarms in the wet lower part of the masses of cast-up seaweed on the rocks close by. Worms were also common in the moss clothing the bottom of an ice-fed pond at Changing Point, Barent's Land. Some live normally in water, while probably all can stand immersion for some time. By experiment it was found that the Cape Lee Cove worm could live for two days in either fresh or salt water. The experiment was only discontinued after the worms had tied themselves up into such an inextricable tangle, that it would have been impossible to tell whether death, if it had occurred, was due to drowning or constriction.

The Mites were mostly of wide distribution, and common wherever they occurred. It is probable that the food of some of them consists of lichens or minute algæ or fungi, as more than one species was found in places where there was absolutely no other food. In particular the absolutely barren, stony, coastal terrace on the north side of Agardh Bay may be mentioned. The Mites were nearly all found by turning over the flat stones with which the ground was so abundantly strewn. Only one species, superficially not unlike that friend of gardeners, the so-called Red Spider, walked in the open at all. This species was often found by the sea, even below high-tide mark, but sea water appeared to kill it very quickly. Its red eggs are laid in large batches under stones. They are spherical, and bear scattered bristles on the surface. The empty egg shells are brown when dry, but immediately turn red when wetted. Empty shells are often without the bristles, which are brittle and have probably broken off. The smooth eggs of a much smaller species of mite were also found with their owners, being laid in batches up to a dozen in number.

The single species of Spider was common everywhere. It is a small black animal. It was usually found under stones, in company with Mites and Springtails, but careful search revealed that it made little irregular webs in the angles of stones, or at the mouths of small cracks in the ground. Remains of midges were occasionally found under the stones with the spiders, which also readily eat mites if confined with them in a tube. The small lens-shaped cocoons, containing some seven or eight spherical orange eggs, or similarly coloured newly hatched young, were common under stones, usually with a spider under the same stone. Slightly older young ones, which soon turn black, were rare, and nearly all the rest were full grown.

Springtails or Collembola were numerous in individuals, different species frequently occurring together. The families Poduridæ and Entomobryidæ were well represented, though the species were few, but Sminthuridæ were very rare. Springtails were found on the surface of ponds, and on the moss, mud, and stones at the edge. A greater variety of species was found by turning over stones, but the number of individuals in a given area was less. At times hundreds at once could be sucked into a tube from the surface of still water. A tiny white species was found at Cape Lee under stones between tide marks, in company with the worm mentioned above. Some of the Springtails were actually obtained on the undersides of stone which had become entirely submerged by the incoming tide. In Britain the common *Anurida maritima* has somewhat similar habits. A very large creamy-white Podurid was found at Cape Lee in the upper drier portion of a line of warm decaying cast-up seaweed, out of reach of ordinary tides. This fine Springtail was found nowhere else, though specimens of all sizes were abundant here.

The single species of Ichneumon Fly is a minute black insect, interesting because of its sexual dimorphism. The male is fully winged, but the female has wings of less than half the length of his. The antennæ of the female also differ from the male, in that they coil up when dead, while those of the male remain only gently curved. This insect is probably common, but it is so small that it is only found incidentally when one is lying on the ground. It runs actively in and out of the moss, the male taking short flights. A fair proportion of the egg cocoons of the spider examined on the Kuhr Moraine contained single Hymenopterous cocoons, of a size appropriate to this species. This rather suggests that the Ichneumon is an egg parasite of the Spider, though the habitats do not quite tally. The question will probably be settled when the insect is identified or if any parasite breeds out of the cocoons collected.

Of the Flies, the Midges (Chironomidæ) mostly have aquatic larvæ, but occasional larvæ were found in earth at the base of mosses. The latter were brown, and tougher than the aquatic blood worms, which were coloured red to various extents by their blood. The aquatic larvæ mostly live in ponds, burrowing in the mud at the bottom, or forming mud tubes lying on the bottom. They frequently came out and swam about. Bloodworms were also found under stones in the swift brook which runs by the hut at Keilhau Bay. Here were found a few female midges, dead, and stuck to the undersides of submerged stones. These were probably the adults of the larvæ found there, and had crawled down to lay their eggs, after which they had died. Chironomid eggs in their gelatinous envelopes were found under the same stones as the adults. Yellow fly maggots were found in some numbers beneath a bit of tarred tarpaulin lying flat on the ground by the hut at Keilhau Bay, and were brought home for breeding. The common native Anthomyid may breed in damp moss, as two puparia were found in moss, one of them in a tiny temporary pool. This fly sometimes visits flowers, as do occasionally the Midges. It is possible that some of the flies are specially attached to the neighbourhood of the deserted huts, where their larvæ may feed on the abundant filth. In this case they may not be native. A single specimen of a Cyclorrhaphous Fly found nowhere else was seen near the hut at Keilhau Bay.

The majority of the animals found had their home on the coastal terraces. The steep unstable slopes and the summits of the hills supported but a poor fauna of the hardier coastal species. Two species of Springtails were the commonest, living on the undersides of stones. Occasional midges were also found sheltering under stones on the hilltops. The poverty of the hilltop fauna may be ascribed to the greater barrenness, and the absence of tundra

and ponds, and to the greater severity of the physical conditions. There is a greater exposure to winds, and the temperature is usually distinctly lower above than below.

There were several striking features in which collecting in East Spitsbergen differed from collecting in a country like England. The first sensations experienced are surprise at the great paucity of the fauna in individuals and in species, and the complete absence of groups dominant in warmer parts of the world. The ground in most parts is covered with flat stones, which look an ideal shelter for beetles, yet careful search reveals nothing but the most minute animals. Even these are not in any very great numbers. The same applies to the ponds, which are numerous on the coastal plains, and have nice mossy sides, appearing at first sight a collector's paradise. But except for the local abundance of Chironomids and *Lepidurus arcticus*, *Daphnia pulex*, and one or two other Entomostraca, they are quite barren. Woodlice and terrestrial and fresh-water Molluscs are also conspicuous by their absence, but the entire absence of beetles is the most striking deficiency. Nowhere was there any trace of leaves having been eaten by the larvæ of Sawflies or of Lepidoptera. The summer blizzards give some idea of the unsuitability of the climate for invertebrate habitation, but it would be necessary to stay for a winter to appreciate it fully.

Botany

Though there was no fully qualified botanist attached to the expedition, the writer collected specimens of the higher plants, and made some notes on the plant associations of Edge Island and the coasts of Stor Fjord. As it is proposed to publish a full account of the botanical results elsewhere, only a short summary is given here.

The flowering plants of Edge Island are all herbs or prostrate shrubs. The height of a foot, which is reached by the flowering stems of one of the grasses, is exceptional. The great majority of the plants have a tufted or cushion habit, which is a common feature of high Alpine and Arctic plants. In spite of the insignificant stature of the plants, the abundance of the Arctic Poppy (*Papaver nudicaule* var. *radicatum*), of the four showy Saxifrages, the Purple (*S. oppositifolia*), *S. greenlandica* with compact cushions covered with creamy or pure white flowers, the yellow *S. Hirculus*, and the Drooping Saxifrage (*S. cernua*), and of the cushions of the two common large-flowered *Cerastia* gave the less bare parts quite a gay appearance.

Most of the country bears only an open vegetation, composed of but a few species of flowering plants, with a variety of mosses and foliose lichens. The abundant stones are richly coated with encrusting lichens of many kinds. The vegeatation varies somewhat with the dampness of the soil, and probably with the amount of exposure to the winter snow. Another factor is the presence or absence of soil polygons, which are especially common on the tops of the hills and bottoms of the valleys, but local on the coastal terraces. In places on the coastal terraces where water collects, moss bog or tundra is developed. The vegetation of the tundra is closed, and consists mainly of mosses. There is a small bog flora of a few grasses, buttercups, and a Cotton Grass (*Eriophorum Scheuchzeri*). Liverworts and toadstools also grow amongst the mosses. The most extensive tundra is found on the dolerite plains of the west coast, where fair-sized ponds occur in the bogs. In favoured situation the scarps of the dolerite sills bear a relatively rich flora of higher plants, interspersed with thick moss cushions. Some species appear to be peculiar to such situations.

The flora of Edge Island is much poorer than that of the west coast of Spits-

bergen. Hanna Resvoll-Holmsen records 133 species of vascular plants from the Spitsbergen Archipelago and Bear Island, but only about 46 were found on Edge Island. One striking absentee is *Cassiope tetragona*, which is common on the west coast of Spitsbergen. It is possible that this is in part due to small snowfall, as Mr. T. M. Harris has told the writer that round Scoresby Sound in East Greenland *Cassiope* only grows on ground which is covered with snow the whole winter, and is immediately killed if the snow is removed. *Salix herbacea* also was not found on Edge Island, only the very similar *S. polaris* being present. Perhaps the most remarkable feature of the flora is the distribution of the Mountain Avens, *Dryas octopetala*. This is a common and often a dominant plant on the west coast, and was found abundantly at Whales Bay and Mohn Bay on the east coast of West Spitsbergen, though it was not found at Agardh Bay, where the part of the coastal plain visited during our short stay was almost devoid of all life. In spite of this abundance on the other side of Stor Fjord, not a single plant was found on Edge Island, except at Cape Lee, the nearest point to West Spitsbergen. Here two patches were found. This is the more remarkable since the hairy styles fit the fruits for wind dispersal, and the plants were flowering and setting seed plentifully wherever they were found. *Salix herbacea* was also found with the *Dryas* on the west side of Stor Fjord.

At Whales Bay, on the coastal terrace near the hut on the north side, the vegetation had rather a different aspect from any on Edge Island or Barent's Land. The grasses were more numerous in individuals and in species, especially round the ponds. The plants in general were more luxuriant in their growth than on Edge Island, though the ground became very bare at only a hundred or two feet above sea-level. The vascular flora as a whole agrees with the invertebrate fauna in being considerably poorer on the east of Spitsbergen than on the west. This is entirely what the climatic conditions would lead one to expect.

APPENDIX III GEOLOGY

N. L. Falcon

This appendix aims at giving a general, rather than a detailed, account of the geology of Edge Island. No reference is made to the series of fossils collected, which have not yet been determined. The bibliography at the end, which has no pretence of being exhaustive, includes those papers which make any reference to the island. There is very little published literature on the area. The writer takes this opportunity of thanking those who assisted him in any way.

Stratigraphy

Edge Island is largely made up of Triassic rocks varying from shales below to sandstones above. Beds of Rhætic age have been shown to be present high up in the succession at Cape Lee, and it is probable that Jurassic and even younger beds are represented on the island. There will always be great difficulty, however, in determining the age of the upper sandstones owing to their shallow-water nature and poor fossil content.

Three lithological groups can be recognized in all parts of the island north of Deevie Bay visited by the expedition. These groups are extremely constant throughout the area. They are, a lower group of bituminous shales, a middle group of blue and purple shales, and an upper sandstone and shale series.

(*a*) The lowest or oil shale series has a maximum exposed thickness of 400 feet and extends down below sea-level. The lowest beds are only accessible

in ravines and are scree concealed all along the coastal cliffs. The series is formed of tough well-bedded bituminous shales with intercalated limestone bands and bands of septarian nodules, the latter being most noticeable in the higher horizons. Both the limestones and shales are fossiliferous and yield a good fauna of Ammonites and lamellibranchs. An interesting feature of the series is that it contains reptilian remains in quite a good state of preservation. One skeleton, apparently a *Plesiosaurus*, which is now in the Sedgwick Museum, Cambridge, was obtained from a gorge near the end of the Kuhr glacier on the north side of Deevie Bay. This locality should be visited by any future expeditions, for other skeletons were visible which were beyond our powers of extraction. Similar remains were found at Cape Lee at about the same horizon near the top of the Oil Shale Series, and other observers have recorded fragments from this locality.

The oil shale series has not been seen in the Negro Point Peninsula south of Deevie Bay, and is probably absent.

The upper 100 feet of the Oil Shale Series forms a conspicuous scarp which is very noticeable from Freeman Strait and Stor Fjord.

(*b*) The Oil Shale Series is followed conformably by a series of Blue and Purple Shales about 250 feet thick. These shales contain numerous bands of ferruginous limestone and ironstone nodules which have yielded a good fauna of Ammonites (*Ceratites* and *Ptychites* types) and lamellibranchs. *Halobia* is a very common lamellibranch found in these beds, which are evidently to be correlated with the *Halobia* beds in the Trias of the Ice-fjord region.

(*c*) This series of shales passes up gradually into a thick series of alternating fissile sandstones and sandy shales, and these beds are found up to the highest points of those parts of the island visited. The age of these beds is rather problematical, but they are certainly of Jurassic age in part, for Jurassic fossils have been found in them at Whales Point and Negro Point (P. v. Wittenburg). It is probable that younger beds are represented, but the unfossiliferous nature of the series make the determination of age difficult.

The coming in of sandstones shows that the sea had shallowed. The sandstones are of "estuarine" or deltaic type. They show false bedding, ripple-marking, sun-cracking and rain-pitting of interbedded muds, and contemporaneous brecciation. Badly preserved plant remains are not uncommon. A reptilian jawbone with teeth was found in a washout structure in this series near Negro Point.

A few thin bands of coal were seen, and coal fragments were often picked up on the scree slopes, but it is doubtful if any of economic importance occurs on the island. De Geer states that "coal-seams are found down to the sea on the east coast of Edge I." It would be interesting to know where this occurs, for the one landing that we were able to make on the east coast near Cape Heuglin showed that the succession there was essentially similar to that on the west coast.

The succession described above is very constant in Edge Island and extends northwards into Barents Island. In the peninsula south of Deevie Bay, however, the sandstone facies comes in earlier than in the northern part of the island. The Purple Shales and Oil Shales appear to be absent. An examination of the east coast, which we were unfortunately unable to visit, should yield evidence which will explain the difference of facies, and perhaps horizon, between the north and south shores of Deevie Bay. There may be some faulting in this southern area, which remains to be proved.

Structure

Almost everywhere on the island the strata are practically horizontal and no important faults are visible. What changes of level there are are very gradual—for instance the Oil Shale Group extends up to about 700 feet near the head of Reindeer Valley in the centre of the island, which is only 200 feet higher than its position on the west coast.

The only area where folding is recognizable is in the neighbourhood of Whales Point. Here, in the inaccessible cliff section on the west side there appears to be an unconformity between the sandstone series and the underlying shales. The shales have been folded and partly worn away and the sandstones laid down upon them. The Oil Shales appear to be below sea-level in the region of the point itself, but they rise gradually along the coast eastwards until at Keilhau Bay they extend up to 150 feet above sea-level. This folding may be a case of local warping of the type usually found in areas where a thick series of shallow-water sediments is being deposited. In this connection it may be noted that the sandstones are more irregular and false bedded in this part of the island than elsewhere.

The folding is quite inaccessible and could not be examined at close quarters.

De Geer writes of the Whales Point section: "At the top of Whales Pt. it is possible that Jurassic may occur above what at least at a distance looked like a discordance."

Edge Island and Barents Island must be considered as a horst separated from the mainland of Spitsbergen by faults and from each other by the submerged valley of Freeman Straits. That the west coasts of Edge Island and Barents Island is bounded by a fault is shown by the presence of Jurassic rocks on these islands, whereas on the mainland of Spitsbergen on the other side of Stor Fjord Jurassic and Tertiary rocks come down to sea-level. This sudden change in level must be accounted for either by a flexure hidden under the fjord or by a fault. The undisturbed nature of the Edge Island rocks in general, the straightness of the coast, and the distribution of the dolerite sills (to be hereafter described) are in favour of faulting rather than folding.

Faulting has not been definitely proved along the east coast of Edge Island, but it is probable that a line of dislocation is present here also. The south-western side of Hinlopen Strait has been proved to be faulted, and the strait itself has been shown to be a sunken block.

It may be noted that the Wyches Islands (King Karl's Land) to the east of Edge Island are composed of post-Triassic strata.

Dolerite Sills

The dolerite sills form very conspicuous features on those parts of the coast where they occur. They are found in the Cape Lee area, at the southern end of the Plain of the Russian Base, and also in a zone cutting through the Negro Point peninsula about 3 miles east of Negro Point. The sills, which are usually 100 feet thick, form prominent scarps when they occur high up in the cliff, and when they are at lower levels they play a great part in the formation of "maritime plains" such as that of the Russian Base, which is largely formed by outcropping dolerite. The islands off the coast here are also of dolerite, and this rock is again important on the south side of Deevie Bay, where Ziegler Island, Delitsch Island, and Andree Island (really a peninsula) are made of it. This latter zone, as mentioned above, continues right through the Negro Point peninsula and is responsible for Half Moon Island and the other islands near it. The scattered islands round the mouth of Deevie Bay are also of dolerite.

Backlund has suggested that the sills of the Stor Fjord and Hinlopen Strait regions are intimately connected with fjord-forming faults, and has brought forward as evidence the distribution of the sills, which are never found far inland, and geophysical data.

Backlund considers that the dolerite was intruded into deep-seated fissures, and that afterwards slipping occurred along the plane of these fissures, forming the fjords. There is evidence from the Hinlopen Strait region that the dolerite was intruded before the fjords were formed. The intrusions are probably of late Cretaceous Age, for they are never found intruded into strata younger than Cretaceous. The faulting which produced the fjords and gave rise to the present distribution of land and sea occurred in Late Tertiary times.

The feeding dykes belonging to the sills are not visible in Edge Island, those dykes visible being small and obviously subsidiary intrusions connected with underlying sills ; this is only to be expected if Backlund's theory is correct, for the feeders should be submerged by the waters of the fjords. Another feature that suggests that the feeding dykes are at present submerged is that the sills, as they are followed inland, transgress upwards in the geological succession until they die out. The Edge Island intrusions certainly came from the direction of Stor Fjord.

Post-Glacial Uplift

Since the last stages of the glacial period there has been an uplift of about 200 feet in Edge Island, probably due to the decrease in load consequent on the removal of the ice. The raised beaches are marked either by actual platforms, as at Keilhau Bay just east of Whales Point, or by deposits containing recent shells and whale bones, as on the Plain of the Russian Base. On the south coast of Edge Island and Barents Island this uplift is also made apparent by the presence of erratic blocks and pebbles brought by drifting pack-ice and stranded on the shore when the land was at a lower level than it is to-day. Large boulders of a red gneissose granite are present, for example, on the south coast of Barents Island a few miles west of Cape Waldburg, and pebbles of a similar material together with a fossiliferous chert are found on the south coast of Edge Island 3 miles east of Negro Point. The granites have probably come down Hinlopen Strait from New Friesland or from North Eastland. The chert Dr. Sandford recognizes as being very similar to a Permo-Carboniferous chert found by him in Wahlenberg Bay in North-East Land.

The post-glacial uplift has also had a marked effect on the lower courses of the streams. A steep-sided gorge or canyon has almost invariably been cut in the tough and well-jointed oilshale group. There are two very well-marked canyons in Keilhau Bay.

Drainage System

The present drainage system of the island calls for little comment, more especially as the eastern half of the island remains to be mapped. The ice has retreated sufficiently however to show that the main rivers run approximately at right angles to the coast, and that tributaries also tend to enter the main stream at right angles. The drainage must have been initiated during the fjord faulting period, when streams started to work back from the fault scarps.

The origin of the Freeman Strait valley, now submerged, and of the valley which cuts through the peninsula just east of Negro Point, raises an interesting problem. Both must have been formed before the island existed in its present form, for they run from sea to sea. They are probably relics of pre-fjord times.

Present Surface Conditions

Weathering is exceedingly rapid in Spitsbergen, and the soft rocks of Edge Island are soon split up and disintegrated by the frost. During the thaw in the early summer vast quantities of mud and stones are washed down the hillsides and, in process of time, find their way to the " maritime plains " of the coasts. This downward migration of material goes on with diminished vigour throughout the summer.

On all level places, especially on the tops of the plateau-shaped hills, the expansion and contraction of the ground caused by the annual freezing and thawing lead to the formation of soil polygons.

The sight of any hillside in these Triassic rocks of Edge Island invokes comparison between the abundant detritus present at their base and the Pleistocene " head " so common in parts of the west of England. It is easy to picture the Pleistocene " head " being washed down from the English hills in the same way during the early and late stages of the glacial period, when yearly periods of freezing and thawing were the rule.

Glaciation

Only about one-third of Edge Island is ice covered, and there is no central ice-cap, as many people have thought. The most important ice domes are arranged in a broken ring around the centre of the island, the widest part of the ring being to the south-east. The distribution of the ice may be likened to a horseshoe with the opening, represented by Deevie Bay, facing the south-west. The central part of the horseshoe is the unglaciated region which runs northwards for about 15 miles from the head of Deevie Bay, and which we named Reindeer Valley.

The northern part of the island is not so heavily glaciated as the southern part, but it bears a few subsidiary ice domes, none of which however give rise to any important glaciers. The only large glaciers are those flowing into the sea on the south-east coast and the two big glaciers flowing into Deevie Bay, the Kuhr Glacier on the north and an unnamed glacier on the south of the Bay.

The ice domes of Edge Island come under the heading of Plateau Ice. It is doubtful if the thickness of ice on the higher ground exceeds a maximum of a few hundred feet, and the largest valley glaciers probably contain a greater thickness of ice than is to be found on the plateaus themselves.

There is much evidence on Edge Island to show that there has once been a far wider extension of the ice, and that retreat is proceeding at the present day. There are large moraines, for example, in most of the large valleys to the north of the island which are now quite free from ice—moraines which must have originally been very much larger, for a great deal of their soft material has by now been washed seawards. The pronounced U-shape of the valleys and their truncated spurs tell the same tale. The rock is in general too soft to have preserved striæ and other indications of glaciation, but the dolerite sills outcropping on the southern end of the Plain of the Russian Base show smoothing and striation.

That the ice is at present retreating is shown by the following facts :

1. The snouts of all those glaciers which terminate on land are very blunt and tapering, and there is usually a lagoon or bog between the actual snout of the glacier and its terminal moraine.

2. Comparatively high lateral moraines are common (these have been exposed by the melting).

3. Crevasses are rare.

4. Local sags are not uncommon in the glaciers. In the bottom of these hollows are moulins receiving the surface drainage from upstream and from that part of the glacier which slopes upstream.

5. " Dry ice " is found to a very high level, and névé does not start until about 1500 feet. Only above 2000 feet did the névé look really healthy, as if a little snow was being added to it year by year. Everywhere else the year's snowfall, together with some of the underlying ice, melts away.

6. Numerous streams occur on the glaciers and the plateau ice. The depth of the stream channels varies from 1 foot to about 10 feet. It seems permissible to regard the smaller channels at any rate as the product of the current year's melting.

7. There is much dust on the top of the ice even up to high levels, but the ice is clear at a depth of a few feet (as can be seen in the stream channels). This dust is probably the accumulation of wind-blown material which has been settling on the ice since the melting started.

8. " Dirt cones " are quite common on the glaciers, and are frequently 4 or 5 feet in height. These are cones of ice covered by a layer of soil and gravel which has protected the underlying ice from melting. If a dirt cone is the product of one year's melting, or even of a few years' melting, this points to a considerable annual lowering of the level of the glacier in the regions where the dirt cones occur, and therefore probably over the whole glacier. A dirty cone cannot be many years old, or it would be disintegrated by the movement of the ice.

The general retreat of the Edge Island glaciers offers a contrast to the glaciers at the head of Stor Fjord and to the Duckwitz Glacier of Barents Island, which are at present in a state of violent advance. These advances may be local phenomena, however, due to the fact that the head of ice has only recently been sufficient to overcome the inertia of these glaciers. Glaciers probably flow in bounds, and the bounds of neighbouring glaciers need not necessarily be simultaneous.

There seems to be no doubt that the ice of Spitsbergen is on the whole in a state of retreat.

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APPENDIX IV THE BIRDS OF EDGE ISLAND

C. T. Dalgety, M.B.O.U.

The majority of the birds found on Edge Island were Laridæ (Gulls 3, Skuas 3, Tern 1); Alcidæ (Guillemots 2, Auk 1, Puffin 1); and Anatidæ (Geese 3, Ducks 2). Besides these were one species of Bunting, Petrel, Diver and Ptarmigan, and two Waders.

On the cliffs of Whales Point and Negro Point were the breeding-places of

many Little Auks, Brünnich's and Mandt's Guillemots, Fulmar Petrels, Glaucous Gulls and Kittiwakes. The Mandt's Guillemots also nested in any suitable cliff, sometimes at a considerable distance from the sea, and the Kittiwakes had large colonies in the river canyons at Keilhau Bay.

A small colony of Ivory Gulls was found 6 miles up a valley from Disco Bay and at an altitude of 1700 feet. This year there was only one pair of young ones there. This may have been due to the late melting of the snow, or perhaps an arctic fox was the cause of trouble. In these far northern latitudes birds often miss a breeding season if the weather conditions are unfavourable.

Of the Skuas, the only one seen actually on Edge Island was the Arctic Skua, which is common, and all of which were the pale-breasted variety. Pomatorhine Skuas were common amongst the sea-ice and in open water to the south and east, and one or two Long-tailed Skuas were also seen. The Arctic Tern was only common in the vicinity of small islands.

Only one small flock of Pink-footed Geese, accompanied by two or three broods of young, was seen at Keilhau Bay. No other young geese were seen. Near Cape Lee there was a small island on which a large flock of Brent Geese used to rest. On two or three occasions these provided good sport with a shot gun, and ten were killed there altogether. Only one flock of sixteen Bernacle Geese was seen. A stalk after these was spoilt by a Glaucous Gull, whose screaming warned the geese. The Northern Eider was common all round the coast. Only nine Long-tailed Duck were seen, all of them being old females.

Wherever there were rocks and boulders there were Snow Buntings, the only song bird of Edge Island. On nearly every fresh-water tarn, of which there are very few, was a pair of Red-throated Divers, sometimes accompanied by one young one. The commonest land bird was the Purple Sandpiper, which was everywhere from the seashore to the tops of the hills, wherever there was no ice covering the ground. Only nine Grey Phalarope were seen, one flock of eight and one single bird.

Two single Spitsbergen Ptarmigan and two with broods of young were seen by different members of the expedition. This is the only bird which remains on Spitsbergen the whole year round.

Of sixty-one species of birds recorded from Spitsbergen and Bear Island, only twenty were found on Edge Island and two more at sea to the south and east. But the writer is convinced that, if the spring of 1927 had been favourable for the breeding of birds, a larger number and more species would have been seen.

DISCUSSION

Before the paper the PRESIDENT (Colonel Sir CHARLES CLOSE) said: Mr. Watkins, the reader of the paper this evening, is an undergraduate of Trinity College, Cambridge, who in the best traditions of those ancient Universities has, since the war, conducted a party of members of the University to Edge Island in the Long Vacation of 1927. Edge Island is named after the captain of a whaler who discovered it in 1660, and has not been very much visited since. It lies a little apart from the ordinary route, that is a little to the south-east of Spitsbergen, and is more likely to be closed by ice. Mr. Watkins' party was composed of members of the University of Cambridge, with one exception, Major Morshead, and he, as you will remember, was also a member of the first Mount Everest Expedition. Each member of the expedition about which we are to hear this evening had a special *rôle*, and after Mr. Watkins' lecture we shall hope to hear the views and information which his colleagues may be able to convey to us.

Mr. Watkins then read the paper printed above, and a discussion followed.

Mr. J. M. WORDIE gave a summary of Mr. Falcon's geological report, now given with the paper printed above, and added: I think we must congratulate Mr. Watkins on having had such a very able geologist with his party. At the same time, we all know that Mr. Falcon was very fortunate in his leader. We have heard to-night a most interesting lecture, but Mr. Watkins has only given us a sample of the humour of the expedition. One feels that the party which he took last summer was exceedingly well selected and that they worked together most admirably. All through last winter Mr. Watkins spent much time ascertaining what was essential and what was not, with the result that the expedition was very carefully planned and exceedingly well led.

Dr. H. M. WOODMAN: As the medical officer of the expedition I have less to say than any one else, because there was nothing of a really acute or urgent nature that called for my attention. There are, however, quite a number of medical problems of interest in connection with polar work.

On our expedition to Edge Island we could hardly regard scurvy as a menace, because it has been shown that at least four months of exposure to deficiency of certain vital food factors are necessary before any symptoms of scurvy are likely to arise. On the other hand, there is no doubt whatever that if the sledging expedition on which a few of us went for eleven days had lasted longer on the rations we had with us, which consisted of pemmican and plasmon biscuits, and a few samples of dried fruit, we should have had scurvy. It is easy enough to guard against scurvy on board ship and camping, but how to take sufficient anti-scorbutics when sledging is still a problem Arctic expeditions have to face. The only articles that can conveniently be taken are dried milk and such things as marmite and vitmar. In our case, even if we had been subject to the possibility, we had sufficient antidote in the form of bear, seal, and goose with us. There is no better antidote than fresh meat.

The only other medical conditions peculiar to Arctic and Antarctic expeditions are frost-bite and snow-blindness. We could afford to disregard the dangers of both, because on the Edge Island expedition we hardly had cold enough conditions for frost-bite to occur, although we had two or three blizzards; that on the Kuhr glacier was not a pleasant experience, and the wind seemed desperately cold, but we were seldom more than $-2°$. With reasonable precautions there was no danger of frost-bite. As regards snow-blindness, there was not sufficient snow for the glare to be strong; moreover, there was not enough sun.

From a medical point of view what impressed me most was the extraordinary degree of sterility of the atmosphere. No such thing as a cold, sore throat, or cough occurred among any of us, and no blister, bruise, or any other wound went septic. Apparently there was no risk of it doing so, owing of course to the fact that few microbes can live in so low a temperature, and what few can are probably imported by members of the expedition.

Incidentally, the eleven days spent on the Kuhr glacier provided some rather interesting psychological studies, because every member had his own method of preserving a normal mentality and outlook on life. Mr. Watkins used to proceed at frequent intervals from his tent out into the ice and snow with bare feet, because he claimed that that was the only method of keeping one's feet hygienic that could be conveniently exercised in the Arctic. I thoroughly agreed with him, but I did not attempt to enforce the treatment on other members of the party. Mr. Forbes used to sing at any hour of the night or day, and what time he was not singing he spent in writing a diary of abstract conclusions and observations about his thoughts on existence, which we hope

he will one day publish for the benefit of explorers in their spare moments. Major Morshead used to clean his teeth at all possible moments; the rest of the time he spent in telling witty stories. Woolley and I regarded ourselves as the most normal members of the expedition, because we confined ourselves to our sleeping-bags and refused to come out in any circumstances!

Mr. V. S. Forbes (Assistant Surveyor): In the absence of Major Morshead in India I must venture a few remarks upon the surveying side of the expedition. I have no qualifications as a surveyor, but I went hoping to learn a great deal from Major Morshead, and I was not disappointed. The Russo-Swedish expedition in 1899 went to the Spitsbergen Archipelago for the purpose of measuring an Arc of Meridian, and in the course of this duty mapped the western coast of Edge Island with great accuracy and detail on a scale of about $3\frac{1}{2}$ miles to an inch. They measured a base and completed the subsequent triangulation, and their map appears as a mere ribbon of territory, perhaps 2 inches wide, as they did not penetrate farther inland than about 7 miles.

We arrived in perfect weather, and in sailing down Stor Fjord we were able with binoculars to pick out on the prominent portions of the land the Russian beacons, and these proved of great value to us in subsequent work. When we reached Keilhau Bay two of us set off to the nearest beacon, and when we eventually reached it we were able to take sights inland in the direction of the proposed sledge route which had already been selected by Mr. Watkins.

As you can imagine, the weather conditions made the lot of the plane-tabler anything but happy. There was invariably a strong and biting wind which had a peculiarly numbing effect upon one's fingers, and it is not possible to do any accurate work with gloves on. It was possible to work in comparative comfort if an assistant held a waterproof sheet up to windward. The times during which one had to map areas up-wind were extremely unpleasant. In fact, it has been suggested that from a critical examination of the plane-table sheets it is possible to tell at any particular point in which direction the wind was blowing when the work was done, and that therefore the maps would be of use to the meteorological expert, but I do not think there is any truth in that implication. It was only on the last day of the sledging trip that the weather cleared and we were able to map and establish the unrecorded head of Deevie Bay. On the Admiralty Chart it is shown as a dotted line as well as on all other maps. The most peculiar feature at the head of Deevie Bay is a remarkable moraine which projects into the sea about 7 miles as a hook-shaped reef or bar, which is doubtless due to the retreat of a glacier. On the march across the island we determined our direction by prismatic compass, and at the end of each twenty-five minutes' period of the march we would confer among ourselves and decide how far we had travelled. We found the distance was distressingly small. Though we took the map made by the Russo-Swedish expedition with us, we were never actually on it, but we marked off our distances two or three times a day, and were able to see how we were progressing relatively to the Russian work on the west coast. The difficulty of estimating distance and direction was great because we were most of the time enveloped in mist, and often snow was falling. On entirely featureless plains of ice it is difficult to maintain direction. Clarity of the atmosphere also gave rise to some trouble, because when it was clear we were frequently misled as to the distance traversed. It was only when it was clear in all directions—and that was seldom—that we were able to see our progress in its proper perspective. In spite of all these difficulties we closed our traverse with an error just exceeding half a mile, which is satisfactory.

Before starting on the next stage of the journey Falcon left us, and we were

joined by Major Morshead with his plane-table. The prismatic compass then became a subsidiary instrument. It is a great pity that we were not able to fix the position of Cape Heuglin upon the map—I think it is 10 miles too far east on all existing charts—but the weather was too bad, and we were not able to get an intersection of rays to fix it. We were unable to map the coast between Cape Heuglin and Mount Middendorff. It is represented wrongly on the charts and shown as a bay, whereas it is very nearly a straight coast-line. One thing borne in very strongly upon us in the course of the march across the island was the need of continual reference to the compass. Several times, not having glanced at it for about five minutes, we found to our dismay that we were proceeding in an entirely wrong direction. At times we even doubted the compass, and placed it on the ground, thinking perhaps our ice-axes were affecting it. In conclusion, I should like to pay tribute to Mr. Watkins' powers of leadership and organization. Throughout he was the absolute life and soul of the party. Without him the expedition would never have attained the success which I feel certain it did.

Mr. R. v.d. R. WOOLLEY: As the magnetician on the expedition I probably have not much of interest to put before you. Magnetic conditions in Spitsbergen are extraordinarily interesting, and I may be pardoned if I say they are rather difficult too. The Earth's magnetic field is very weak up there, and the sun just goes round and round overhead. That makes it difficult to fix one's position astronomically. I was able to get six stations done, thanks to Mr. Watkins' generosity in letting me have the ship to myself for several days. I was lucky, because those days on which I had the ship were calm from the magnetic point of view. There were frequent magnetic storms, and they upset the compass completely. There was one storm during which I observed the compass had deviated from its proper position by more than 4°, which is an extraordinary amount. It never deviates more than a degree in this country. Under the circumstances it was fortunate that the magnetic traverse was so successful; but it was made in a period of relative magnetic calm. The theodolite might have been used a little more in connection with the survey. It is however rather bad country for theodolite work because all you can see is the sun, and that is an unsatisfactory heavenly body to use in these latitudes.

Mr. H. G. WATKINS: I just want to add how much I appreciate the work that was done by the members of the expedition, and how wonderfully they backed me up. After all, the work of an expedition depends upon its members and comparatively little on its leader. If the members are not efficient it is not possible to get good work done. My colleagues worked hard absolutely the whole time they were on the island. and I cannot praise them too highly.

The PRESIDENT: In bringing the discussion to a close I think we would all wish to congratulate Mr. Watkins and his colleagues on the admirable work they did in the few weeks they spent on Edge Island, and also to thank Mr. Watkins for his racy and excellent lecture. I might add the fact that Mr. Watkins has recently been elected a Fellow of this Society. There was one slight difficulty in that he was just under age. I do not know whether such a case has arisen before, but it was decided by the Council that Mr. Watkins was fully competent geographically, and therefore might be regarded as legally competent to join the Society. In your name I thank Mr. Watkins, and also his colleagues who have spoken this evening, for the admirable account they have given us of Edge Island.

THE WADI UM DUD IN THE EASTERN DESERT OF EGYPT

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THE paper refers to a small part of the great tableland of Eocene rocks between the Nile and the Red Sea Hills, and between the latitudes of Assiut and Qena (Upper Egypt), termed by Dr. W. F. Hume* the Ma'aza Limestone Plateau. Within this area I have endeavoured to map the country between the borders of the Nile valley in about 26° 55′ N., 31° 40′ E. along a curve south and east to about 26° 42′ N., 32° 8′ E., in the centre of the plateau, where my traverse closes on a point already mapped by Hume and Green on their way from Qena to Assiut in 1911. As a certain amount of new information is involved and as the map was completed too late to be of use in an atlas of Egypt now in preparation, it seems better that these notes should be published than that they should lie idle.† In committing them to print, I express my gratitude to Dr. John Ball, Director of the Desert Survey, and to Dr. W. F. Hume, Director of the Geological Survey, for their kindness, invaluable assistance, and encouragement; and I am indebted to Mr. G. W. Murray and to Mr. O. H. Little,‡ of those Surveys, for reading the paper and for making useful amendments. I wish also to thank Miss G. Caton-Thompson for a map of Qau "Bay" which is now completed and incorporated in my map. The work was done in 1925–26 under the auspices of the British School of Archæology in Egypt, to investigate certain geological problems which related to the superficial deposits of the Nile valley and of the wadis draining into it.

One of the questions to be settled was the course by which pebbles of granite and other rocks known to come from the igneous and metamorphic complex of the Red Sea Hills had reached a point so far distant from their source as Qau (see Map I). Those best qualified to judge—*e.g.* Dr. Hume—were confident that the material had been brought northward along the Nile valley from the neighbourhood of Dena, where two great wadis enter the valley: W. Qena and W. Hammamat–W. Matulla. There was, however, a theory that the material had been brought directly westward from the Hills across the Eocene plateau into the Nile valley at Qau. The problem was made important by the discovery at and about Qau of fossil bones of man and of certain Quaternary mammals bearing in their interstices pebbles of granite, quartz, and other rocks (*Man*, vol 25, 1925, p. 130). But the bones were never found in the granite pebble-gravel of Qau and there was no geological evidence of their age, as they had been collected and buried in dynastic times (XVIth Dynasty).

In view of the circumstances I decided to go to the Red Sea Hills, *via* Wadi Qena, and to trace the granitic gravel from its source there on the latitude of Qau whithersoever it might lead me. I made my headquarters at Qena, at the National Bank, where the Agent, Mr. A. S. Abdallah, gave me assistance of the utmost value especially in view of my complete ignorance (at the outset) of Arabic. Later he handled the forwarding of supplies and mail, and to him I

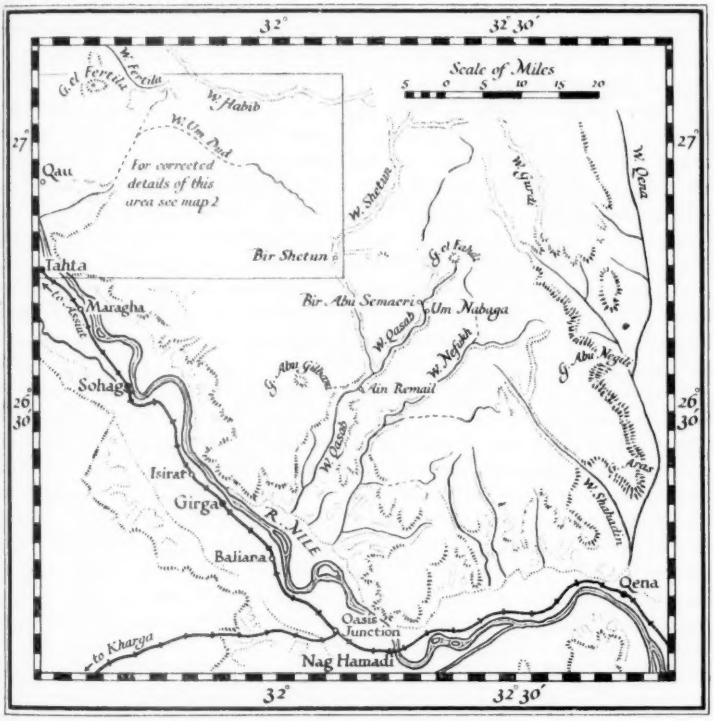
*'Geology of Egypt,' vol. 1 (Cairo, 1925), p. 84.

†This has recently appeared.

‡Now Acting Director, in succession to Dr. Hume recently appointed Technical Advisor to the Egyptian Government (1928).

am extremely grateful. I am indebted to many friends in Qena, notably to the senior officers of the Mudiriya (Province) and to Luka Effendi of the Agricultural Bank.

From Qena I made treks up and down Wadi Qena (also into Wadi Matulla farther south) and northward along the Nile valley. In the first journey down the valley (*i.e.* northward) the gravel was traced on the west (Libyan) side as far as Sohag and then onward along the east side; so that on my arrival at Qau there no longer remained any doubt that the granitic material had reached this place by the lines of drainage which I had followed. It was equally clear that, having done so, the material might be carried northward as



Map 1. *The Ma'aza Limestone Plateau*

far as the Mediterranean: in this connection the igneous constituents of old alluvial deposits in the region of Cairo are well known, and I have found them at the mouth of the Fayum and at other points.

This however did not dispose of the possibility that at some time before the excavation of the great Wadi Qena (which I knew to be of Pliocene age at the latest) material might have been transported according to the second theory; though, even if this were so, it had no bearing upon the age of the bones already mentioned. To settle the point I trekked up Wadi Um Dud on to and

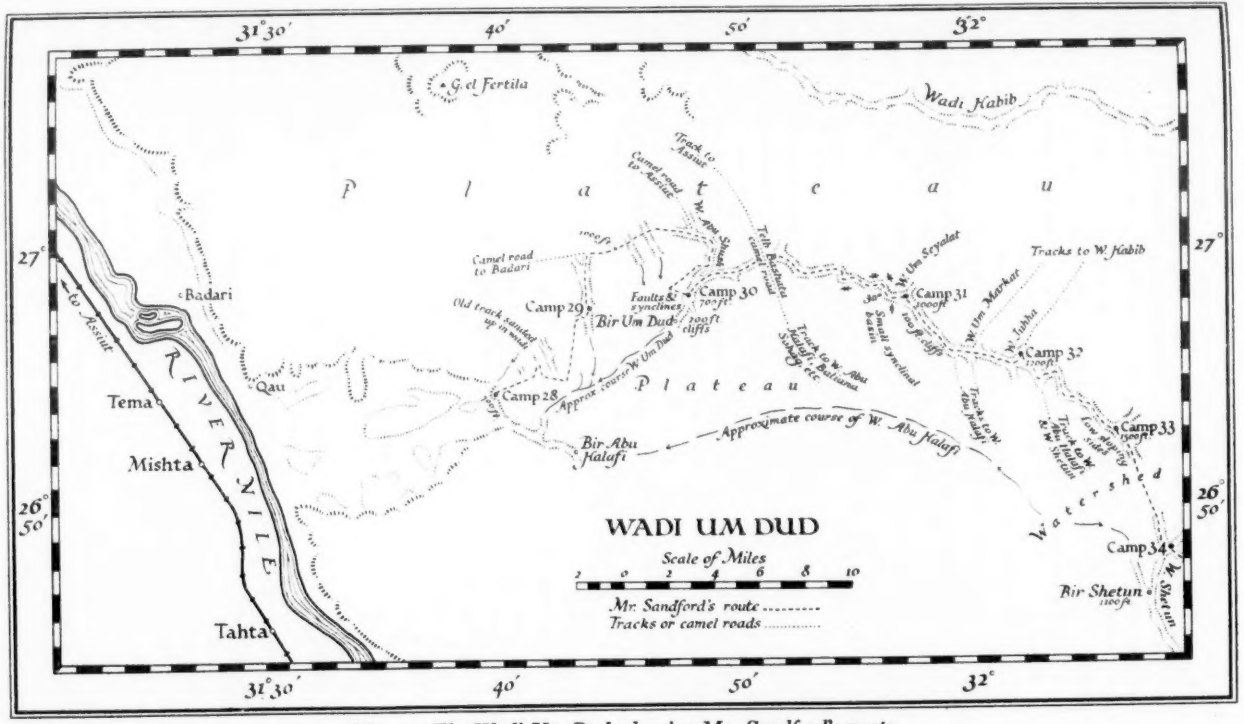
across the watershed and *via* Wadi Qasab back into the Nile valley, where the granitic gravel was again met with and traced thence back to Qena on the east bank. On this journey, as Dr. Hume had foretold, not a single pebble of anything but local limestone and chert was found. Further, it is known to all who have travelled in this part of the Ma'aza Plateau that the drainage system, now dry owing to desert conditions, is entirely domestic. There is no shred of evidence that detrital material from the western flank of the Red Sea Hills was removed other than by the great "gutters" of Wadi Qena and its homologues (and analogues) farther south.

We may now turn our attention to matters of interest to the traveller. The means adopted for mapping were primitive, but, judging by results, more effective than might have been expected. An ordinary Service pattern prismatic compass (Mark VII) was used, and distances were measured solely on the speed of the baggage camels which had previously been checked over long distances and found to be $2\frac{1}{2}$ miles per hour on good ground and 2 miles per hour on bad, or when picking a way between boulders. These rates are well known. A simple compass traverse was plotted from day to day, starting from the apex of the "low desert" or "bay" at Qau (formed by the recession of the edge of the plateau) and closing at Bir Shetûn, already fixed by Hume and Green. The closing point of the traverse had a total linear error (in excess) of less than a mile when the tracing was superposed on the correct position of the closing point (original plotting on scale of $2\frac{1}{2}$ miles to the inch). In view of the tortuous course, perhaps I may submit the map as a justification of rough methods. The position of Bir Shetûn being known, the map is readily adjusted and corrected.

My companions were the admirable Attiya Farag, guide, who was put at my disposal by Dr. Hume, and his able colleague Suleiman Hassaballah, both Ababda. Suleiman was appointed *sheikh-el-hamla*, leader of the *hamla*, or train of baggage camels. In addition I had an Egyptian servant and three Ababda recruited by Hussein Hamed Faragallah, sheikh of an Ashabab (Abadi) community near Qena. None of the men spoke or understood any English, and, this being my first season in Egypt, I was at first blissfully ignorant of Arabic and of the Saidi dialect used by the Ababda. In a small and completely detached community of this sort, however, one soon picks up a certain amount of the language. It should be pointed out that the Ababda are a people of ancient and honourable lineage, of which they are justly proud. They are not Arabs—they are Beja, *i.e.* a Hamitic people, and more precisely are grouped by Murray with the Beni Amer, whom Seligman considers to be the modern representatives of the pre-dynastic and ancient Nubian stock.* We are here at their northern tribal boundary, and with the Bisharin, another Beja people with whom they are grouped, they range through Nubia to the Sudan border. They are a most interesting people.

The caravan consisted of six light baggage camels and one riding-camel: the Survey Department kindly lent me water-tanks which had a capacity of 64 gallons; the men had water-skins, but these, as usual, were a speculation rather than an investment. Owing to the existence of the excellent water-holes of

*See three important papers: C. G. Seligman, *Journ. Roy. Anthrop. Soc.*, 43, 593–704. G. W. Murray, *ibid.* vol 53, 417–423; *ibid.* vol 57, 39–52.



Map 2. The Wadi Um Dud, showing Mr. Sandford's route

Bir Um Dud (to be described) and Bir Shetûn, the water capacity was of no vital importance on the journey from Qau to the mouth of Wadi Qasab, but in Wadi Qena we were able to travel for a fortnight, with one additional Egyptian (who expected all "home comforts" in the matter of water supply), on a maximum capacity of 76 gallons: one camel was on that occasion detached on a four-day journey to replenish empty tanks, giving us the stated capacity. On this journey a little care of the water supply was necessary, and the camels were not watered.

The Ma'aza plateau is truncated on east and west sides by precipitous cliffs, which converge towards the south and meet in a knife-edge ridge at Qena. It is this "wall," which is repeated in the edge of the Libyan plateau, that gives the well-known, if somewhat monotonous, grandeur to the Nile valley in Middle and Upper Egypt (as far south as Esna). The same features are seen in Wadi Qena, where the rigour of the outline is enhanced by the wild desert scenery of the wadi and by the absence of the relief which the strongly contrasting colours of the cultivated land and of the distant silver line of the river afford.

At first sight the top of the plateau appears to be remarkably regular, particularly at midday when shadows are lacking (at which time also it is extremely difficult to judge distances); but in morning or evening the fact is readily appreciated that the plateau is cut into fairly narrow strips by numberless wadis possessing, near its borders, sides as precipitous as those of the Nile valley and Wadi Qena. On every hand one detects slopes and shallow depressions which trend into some one of the wadis. The plateau is, in fact, trenched by a drainage system which has left no part untouched. Above the general level project one or two isolated hills such as Gebel el Fertila and Gebel el Fahdi (a group of hills; see Map 1).

From the watershed to the edge of the plateau the rate of fall of the wadis is very rapid, the plateau itself maintaining a general uniform height. Thus, in the case of Wadi Um Dud the following figures were obtained by a series of readings of aneroid barometer at each place:

Watershed	about 1600 feet above sea-level.
Camp 33	1500 feet.
Camp 32	1200 feet: sides of wadi sloping.
Camp 31	1000 feet: steep cliffs about 100 feet high.
Camp 30	700 feet: precipitous cliffs of about 150 feet.
Camp 28	250 feet: precipitous cliffs of Qau "Bay," 700 feet high at point of ascent near this camp.

Level of Nile cultivation at mouth of Qau Bay is a little less than 200 feet.

Thus there is a fall of some 1400 feet in about 50 miles, and in the lower part of its course the stream has succeeded in cutting a cañon with vertical cliffs 700 feet deep and barely 100 yards wide.

Interesting and important features are to be seen at frequent intervals along the precipitous sides of the wadis of the Ma'aza Plateau—for Wadi Um Dud is but a good example of a type of river valley found throughout the limestone tableland. Such are the "hanging valleys" and "dry waterfalls": the latter is a well-known term, but in using the former I am well aware that the glaciologist will accuse me of treading on holy ground. Nevertheless lateral valleys do "hang"—more so than some of the much-discussed glacial type. Setting

Qau 'bay' and the Nile

The Wadi Um Dud near Camp 30

'Melon Desert' on Wadi Um Dud–Wadi Shetûn divide

Water-worn sides of canyon, Bir Um Dud

aside the normal confluent stream-beds, the lateral channels may be grouped into these two classes. The "hanging valleys" are the drainage channels of water from the plateau in the immediate neighbourhood: they have been unable to keep pace with the rapid rate at which the main wadi, with its torrential river, deepened its bed: they have been left "in the air" just as many glaciologists understand the laterals of glacier-filled valleys were left. The "dry waterfalls" are another stage of this process: they occur at points at which water has spilled over the precipitous wadi-side, with consequent erosion of the cliff-face particularly at its foot. The narrow cleft thus formed advances with use farther and farther into the cliff. Amphitheatres and narrow valleys with vertical or overhanging sides and end are thus formed. Often these coincide with "hanging valleys" at the top of the cliff. Though now dry, the whole of this drainage system is restored to its fullest activity at rare intervals when rain occurs. Rain falls on some part of the plateau in most years, but only locally: during this journey I saw a rain-storm pass across the Wadi Habib region, but we received none.

From observation in the field, with particular reference to the drainage system, the following conclusions may be noted:

The system, though deeply trenched, was still in an early stage of development when the advent of desert conditions cut off the water supply.

The run-off, while it lasted, was extremely heavy.

The Nile valley and Wadi Qena were cut rapidly and probably to great depth below the existing alluvial floor: the drainage from the plateau was unable to keep pace with this, with the resulting steep gradients and "unfinished" lateral valleys.

Owing to subsequent infilling of the greater depths of the Nile valley and Wadi Qena, the gradients of the plateau-wadis have since tended to fill up in the down-stream part, though erosion has continued in the headwater region.

Since the advent of desert conditions this process has been spasmodic, localized, and exceedingly slow. In certain wadis the position and configuration of cliffs, which in a non-desert climate would have been completely altered, have evidently remained unchanged since (probably) Pliocene times.

Attention may be called to the disposition of great lava-like cascades of porous travertine (tufa) in Wadi Qasab, about 28 miles from the Nile: these are plastered on both the towering sides of the narrow wadi to a height of about 200 feet, and there is no appreciable sign of recession of the cliffs above or alongside them having taken place since their formation. There are similar buttresses nearer the Nile, on the north side of the wadi, which, as Dr. Hume has pointed out (W. F. Hume, *op. cit.* p. 100), occur below gullies in the surface of the limestone plateau. Dr. Hume also calls attention to the distribution of the travertine in the Western Oases, the Nile Valley and the Eastern Desert in a definite (climatic?) belt between 25° and 26° N. latitude. Well-rounded boulders of limestone, of great size, occur in the travertine of Wadi Qasab, and they are more numerous towards the bottom. Here there is no infallible proof of exact age, but in the Nile valley I have obtained good stratigraphical evidence that the travertine occurs in the uppermost part of the Pliocene series. There is, in fact, abundant evidence that the Nile valley and its great "bays" (*e.g.* mouths of Wadi Qasab and Wadi Um Dud or Qau bay), and Wadi Qena,

were cut to their present depth, and deeper, by Pliocene times, when they were filled with detritus. In Pleistocene times a descending series of river terraces was excavated in the Pliocene "filling." To this sequence of events the plateau-wadis conformed. Pliocene deposits are seen to pass into the mouths of the narrow defiles, but for the greater part these, and terraces, have been swept away (though the latter are rarely seen): bedrock is concealed beneath boulders and gravel near the mouths of the wadies, and, in those known to me, for many miles up-stream.

Wadi Um Dud.—The Wadi is reported to be impassable for some 10 miles below Bir Um Dud, and the only passable route lies by way of the top of the limestone plateau. Secondly, there is no way up the precipitous cliffs which form the south side of Qau bay, and so there is no direct route to Bir Shetûn in the centre of the plateau. The normal ascent from the Nile valley to the plateau is by a well-marked camel track at a point about halfway along the north side of Qau bay, where slips and minor faults have reduced the usually inaccessible cliff to a region of irregular hills and narrow valleys. Instead of taking the usual route, however, the party moved to the head of the bay to try its chances on an ancient and unused track known to the guide Attiya. If successful this ascent of the steep cliff-face, though entirely unorthodox, would save one or two days on the journey and effect a valuable economy of time and water.

A halt was therefore called at the head of the bay (Camp 28) and we reconnoitred the track. An inspection showed that the greater part might be negotiated by our light and agile baggage camels: there were however two rock steps which effectively barred any progress. After some debate it was agreed to devote the next day to "road making" and then to decide on the possibilities. The effort was successful, and by wedging, levering, and hammering, the steps were partly removed and blocks were banked against the remnants to provide passable inclined planes. Later in the same day I visited the mouth of Wadi Um Dud. About 2 miles beyond the point at which the wadi emerges into Qau bay two impressive cañons unite—from the north comes the true Wadi Um Dud and from the east Wadi Abu Halafi; at a short distance from this point the former is littered with great blocks which have fallen from the sides. It is from this point that the wadi is reported to be impassable (*i.e.* to Bir Um Dud): judging from what I saw at the above-named spot a few days later and from similar features seen elsewhere, I have little doubt that this is true.

Wadi Abu Halafi is quite as important a line of drainage as Wadi Um Dud, and is also reported to be impassable in places; certainly the short distance to Bir Abu Halafi by a path which leads between and over great blocks and boulders, is not an encouraging start for camels. The course of the wadi to its headwater region is marked on my map by a broken line, based on repeated questions to the guide during our march up Wadi Um Dud and across to Bir Shetûn. It contains one pool, Bir Abu Halafi, which is picturesque. Palms have been planted and are growing quite well, and there is an abundance of tall grasses as well as the usual desert plants in luxuriant growth. At the time of my visit there were a few poorly filled pools of saline water, and, a little farther up the wadi, good drinking-water seeps out of the limestone a few feet above

the floor on the south side: this was almost dried up, and there was not enough to provide a man with a drink. Miss G. Caton-Thompson and others visited the spot in 1923, and I am told there was then a good trickle of sweet water. This is the only flowing spring of sweet water that I know of in the Ma'aza plateau, such water as exists being found in one of two conditions:

Salt pools such as those just described are fairly common in the beds of the gorges of the Ma'aza Plateau, but they are of little or no use to men or animals: thus in Wadi Qasab there are Bir Abu Semaeri, Um Nabaga, and Ain Remail; but the last was dry in February 1925 and filled with 10 feet of sand, its palms dead and dying.

Serviceable water is conserved in natural rock reservoirs dependent on the run-off of the spasmodic rainfall, and the water, protected from the sun, may last for years. Even when water is not visible it can be obtained by scraping a hole in the sandy mud of the floor of the rock chamber, and waiting. Such are Bir Um Dud and Bir Shetûn.

Our work finished at Camp 28, next day we used the new road up the cliff. The riding-camel was used as leader, and took its share of the general load, an indignity to which it objected volubly. The ascent was accomplished without incident and the cliff found to be about 700 feet high (corrected aneroid reading). From Camp 28 to the point at which we joined the road from Qau and Badari (the usual route from the Nile valley already mentioned) next day we saw no sign of our path having been used for a very long period: a track of great age was visible, but no stone was seen out of place and the surface had a uniform desert polish: the only sign of life was one ball of camel-dung of indefinite age. Attiya told me that when a boy he had been shown the northern end of this track by his father; his value as a guide will be appreciated by a glance at the map: we only turned on our tracks once, because the old path, leading across a deep wadi, was lost in a sand-dune and a detour was made round the wadi *via* its upper slopes. Stones set on end, the Arabs' direction posts, remain at intervals along the track.

Camp was made in a tributary of Wadi Um Dud, and next morning we joined the important camel road from Qau and returned to the "*serir*," or plateau. The route skirts the lower flanks of Gebel el Fertila and passes through extensive fields of flint and melon desert: the "melons" being spherical flint and chert concretions, virtually indestructible, which are weathered out of successive bands of the Eocene strata and thus concentrated on the surface. Farther on the track joins an important camel route from Assiut, which, with the Telb Bashata (see below), I believe to run thither by Wadi Fertila and Wadi Assiut; the combined road, now a broad highway, passes into Wadi Abu Shush—only to climb up its side on to the plateau again after a short distance, the wadi being obstructed by blocks and boulders and rock steps passable to men but not to camels. Finally the road comes to the edge of Wadi Um Dud at a point at which minor trough-faults have broken up its precipitous side. A somewhat precarious path, which runs for a short distance along an undercut ledge, leads down into the wadi, where camp was made (No. 30). While we were camped here the men created a diversion of some interest: one of the camels had suffered from a sore and saddle-gall for some time, and they now branded the animal with a bar of iron like a poker, burning

a deep crescentic furrow at a radius of 3 to 4 inches below the wound. They repeated this about a fortnight later; I noted no marked improvement.

The geological structure of the Bir Um Dud water-hole is of considerable interest. On walking down the wadi from camp one sees nothing unusual—it is a typical cañon of the limestone desert type with high precipitous sides. Without warning one comes on a narrow and dark slit in the rocky floor. A way can be found down this shaft, and at a depth of about 20 feet one reaches a sandy floor, to find a cleft about 20 feet wide with walls that converge and almost meet overhead, so that sunlight enters by an opening barely 10 feet wide. The cleft extends 100 yards or more down the centre of the wadi, which is there broken up; rough steps descend to the level of the floor of the cleft, and beyond this point the wadi is confused and broken. At the point where confusion begins the axis of a slight syncline passes directly across the wadi, and this no doubt is the cause of the sudden break. One can also enter the cleft at its lower end and walk in cool shade back to the previous point of descent. The walls and undersides of projecting ledges (which once met to form a true tunnel) are smoothed and waterworn; huge blocks of the roof have fallen and are similarly waterworn on the under surface. The signs of water action are especially marked at the upper end, at our first point of descent; and here, in the farthest and darkest corner, is the water. At the time of my visit its surface was about 10 feet in diameter; I was unable to measure the depth, but at the upstream wall it may be considerable, *i.e.* perhaps 10 feet. The lateral walls are of solid rock, and the downstream side is a sharply sloping dam of sand and silt. The water was of excellent quality, and clean. No plants were growing in it, perhaps owing to the almost complete darkness, but, as at Bir Shetûn, a special flora lives in the shade of the gorge. Above the water-hole we found small cups in the waterworn surface of the solid rock (*cf.* pot-holes), containing small quantities of crystal-clear water from which we were able to fill our tanks without touching the main supply.

Bir Um Dud is an ancient swallow-hole and underground stream-course, of which the roof has collapsed. It is cut along a joint in thick-bedded Lower Eocene foraminiferal limestone, immediately below thin-bedded clayey limestone with "melons"; the lateral joints have also been widened by abrasion and solution.

Bir Shetûn, with its adjoining satellite Bir Shetîun, is a precisely similar structure, but the descent is in that case some 70 feet: there also sunlight enters and an abundant and special vegetation results (see W. F. Hume, *op. cit.* p. 89). Both wells owe their supply primarily to heavy showers which may be expected at intervals of a few years: the torrents which result course down the wadi and plunge into the swallow-hole; silt, stones and boulders are deposited in the corridor at some distance from this temporary waterfall and thereafter form a retaining wall to the water-hole. The loose material also forms a reservoir from which water drains into the hole. That some of the water may be received by seepage from the surrounding limestone I do not deny, but it should be pointed out that these water-holes are probably well above the level of saturation and their water is sweet, whereas the true springs or seepage-holes in this region are saline.

Although the water-hole which I have described was the only considerable

reservoir at the time of my visit, it is not considered by the Ababda to be the main storage basin: this is situated at the lower end of the cleft, where the syncline passes across the wadi and breaks up the strata. It is a water-worn hollow, or pot-hole, in solid rock. We found it empty and dry; it is supposed to hold water for three years. The upper pool already described is said to last only three months after rain, but water may be obtained for upwards of a year by scraping the sand at its bottom.* Thus it would seem that rain had fallen within three months or so of our visit, and we are led to an interesting point. At rare intervals heavy rainstorms may be expected in this region; they flood the wadi and a "*seil*" or torrent dashes down it, sweeping everything away and moving great blocks of stone. The signs of the passage of a *seil* are clear enough for years afterwards—tangled masses of dead vegetation, piles of gravel near the centre line of the wadi, the sides of which are scoured deep and left bare, blocks and boulders piled high in the utmost confusion. Such a torrent fills the water-holes to overflowing. Periodically however lighter rain may be expected, which provides a less violent flood, often very localized, and smooths out some of the confusion left by the *seil*. Further, it stimulates the desert plants to growth, and seeds germinate in the fine silt of the wadi floor; a few weeks later it is possible to mark the exact limits of the last rain by looking at the vegetation. Thus we found that rain had fallen near the mouth of Wadi Um Dud, and as far as Camp 29, but not in Wadi Abu Halafi; Attiya judged it to have fallen within four months of our visit. Now we find that water has flowed down into the upper pool of Bir Um Dud, but none has reached the lower reservoir. There was abundant evidence on all hands that the flow was small and that it had reached no farther than stated: it was not a *seil*. Again, about a mile up the wadi from Camp 30 we found a few gallons of good water in a smooth rock hollow directly on the wadi floor, sheltered from the sun by a fallen block, but there was insufficient to withstand evaporation for more than a short time—another indication of a fairly recent shower. Continuing, we traced by the flourishing seedlings the favoured area on which rain had fallen to a point a little above the crossing of the Telb Bashata, above which everything was dead and parched. Lastly, we found that a light shower had fallen near the junction of Wadi Um Dud and Wadi Um Seyalăt, and in both wadis, but there had been only a feeble trickle of water on the wadi floor, which was soon absorbed. There had thus been a number of local showers over the area, and our drinking-water was probably, in part at least, only a few months old. Upper Wadi Um Dud, Wadi Shetûn, and the remainder of the ground we traversed had not been so favoured.

*In *Blackwood's Magazine* for April 1928 there appeared a most interesting article entitled "A Desert Expedition" by " Bedan," describing a hunting expedition in that part of the plateau immediately adjoining the district with which we are concerned. The expedition took place in February 1927, *i.e.* just a year after my visit, and my friend and *sheikh-el-hamla* Suleiman Hassaballah, was taken as hunter. He reported (p. 528) that "the spring of Bir Um Dood had failed, that there was not enough water for all our camels, and that it was more or less undrinkable." I think Suleiman's second statement was really the correct one. Bir Um Dud is not a spring in the true sense; it is a most useful water-hole, but any attempt to water so large a party from it would have exhausted it. I suspect that such water as remained (probably obtainable only by scraping a hole) would have been drinkable.

Bir Shetûn is reputed to be a permanent reservoir of fresh water; its satellite, Bir Shetîun, is stated to last for three years after rain: when we visited it it was a trifle stagnant, and the water of Bir Shetûn was greatly to be preferred. I am well aware that the time which a water-hole will "last" depends on the amount drawn from it, apart from natural wastage; the figures given here are those of normal usage by the scattered and wandering population. Bir Um Dud is rarely visited; Bir Shetûn may be used for considerable periods by small parties grazing camels. We met nobody from the time we left the Nile at Qau till we regained the river at Baliana, at the mouth of Wadi Qasab.

From Camp 30 the route lies along the course of the Upper Wadi Um Dud, winding at times between the great blocks and boulders which strew its floor. From this point to its watershed the valley has a tortuous course, dependent, in some cases at least, upon the existence of shallow synclines. These are marked on the map, and in one locality (near Camp 31) seem to form a small basin through which the stream cuts its course, sometimes following a synclinal axis, more often skirting the inclined strata. In this and in similar regions of meandering course farther up the valley some of the complexity is lost in the map. How far these synclines are due to settlement of the strata, to underground solution of the limestone, or to desiccation and crystallization of salt* and gypsum, it is difficult to say; but to these processes rather than to any important tectonic movement or breakage the synclines and faults noted in this paper should be assigned. Similar irregularities are common in Wadi Qasab and in other parts of the plateau, hading and dipping in every direction. Along the Nile-ward edge of the Ma'aza and Libyan plateaux such features have long attracted attention and have been cited frequently as important evidence in favour of the theory that the Nile occupies a narrow fault- or rift-valley. The theory was laid to rest nearly twenty years ago,† but it is resurrected from time to time with the same arguments.‡

As we proceed up Wadi Um Dud, the sides become lower and less precipitous until, about a day's march from the watershed, the valley is open and no longer a cañon. This change is partly due to the valley here being cut mostly in higher and less massive beds of the Eocene, with clay-limestone, melons, and tabular flint beds. Some important tributaries join the main valley, and their names, as given me by Attiya, are marked on the map. The titles refer as usual to characteristic features and in some cases to the vegetation most noticeable along the wadi floor. Such are Wadi Um Seyalât, "Valley full of *Seyâl*," a type of acacia, and Wadi Um Markât, "Valley full of *Markh*" (*Leptadinia*). Most of the wadis of the Ma'aza Plateau contain a fair crop of "hashish" (desert plants) which provide grazing for camels. I saw some cut stumps of *seyâl* reaching a diameter of as much as 1 foot, but bushes of this size had disappeared. I am told that they were cut by the Ababda and sold in the Nile valley as fuel during the late war.

*Efflorescence of salt abounds on rock and clay surfaces, and is collected for domestic use by native travellers as their wants demand; gypsum and other substances are mixed with it.

†See papers in the *Geological Magazine*, December, vol 3 (1910), by Dr. J. Ball (pp. 77–79), and by Dr. W. F. Hume (pp. 385–389).

‡*Cf.* Andrew C. Lawson, "The Valley of the Nile," Univ. of California *Chronicle*, vol 29, 1927, 235–259.

Some camel routes were noted and their destinations are given on the map; the most important is the Telb Bashâta,* the great road from Assiut to Sohag, Baliana and other places in the south. A grave marked at the confluence of Wadi Um Markât is "ancient," *i.e.* the stones are darkened and polished on the exposed surface, but probably it is Arab. It orientates 50° magnetic;† there was no distinctive mark, either Christian or Moslem. At the confluence of Wadi Guhha I found the first sign, a small cairn, of Hume and Green's party which traversed the plateau from Qena to Assiut, and the next day we found one of their tent-pegs, dropped fifteen years before, which subsequently I returned to Dr. Hume.

Above the position of Camp 33 the wadi, as such, disappears and a number of shallow gullies drain the high plateau-watershed. About a quarter of a mile from this camp, on the route to Bir Shetûn, there is a small pit 4 feet across formed by the collapse of the roof of a subterranean water channel in the limestone. The channel follows the course of the wadi along a joint in the limestone 10 feet below the surface at the point seen; I had no opportunity of exploring it, but it might contain water at its lower end; my men knew nothing of it. Alongside was a small mound or knob of crystalline calcite, about 3 feet high, the long needle-crystals being in thick layers separated by irony films, seven in number.

The route continues to Wadi Shetûn over most desolate plateau, broken here and there by small buttes, which weather into conical hills capped with blocks of hard rock; thence to the well of that name, where we replenished our water-tanks to carry us on till we reached the Nile.

I have already referred to Bir Shetûn: it is a delightful place, full of interest; it is 40 miles from the Nile by wadi, but only 25 miles over the plateau as the crow flies. The water-hole is some 70 feet below the surface of the upper valley floor, and is reached by steps roughly hewn in the rocky sides. I was told that this work was done by a French engineer, but no information as to date was forthcoming; the steps have certainly been in use for a very long time. The pool and the narrow cleft or cañon downstream of it are a world apart from the surrounding deserts. A luxuriant and special vegetation grows here, which Dr. Hume describes: "Bulrushes, over four metres in height, cluster around the basin, tamarisk and *samyuk* (*Ficus pseudo-sycamorus*, Decn.) bushes brighten the ravine, and *lassaf* (*Capparis spinosa*, L.) clings to the rocky sides" (*op. cit.* p. 89). In the winter of 1925–26, shortly before my visit, three shoots of date palm had been planted near the pool by an Arab from Baliana, and in a few years these will still further beautify the place. The pool supports a small but remarkable fauna, which I collected and brought back to England,‡ comprising one freshwater snail (*Bullinus* (*Isodora*) *truncatus*, Fér.), in abundance ; two water-bugs, one of unknown species (*Anisops varia*, Fieb. and *Arctocorixa sp.*) and two water-beetles, one unknown (*Anacæna limbata*, F. and *Agabus sp.*?). These were identified by experts at the British Museum to whom Professor E. B. Poulton, F.R.S., kindly submitted them. Here also I caught a Clouded Yellow butterfly (almost certainly *Colias edusa*, L.) some

Telb may be an Ahadi or other dialect-word for the correct Arabic word *Darb*.

†The magnetic variation is about 1° west of true north.

‡Here and elsewhere I collected plants and insects, which I handed over to the appropriate Departments in Cairo.

months out of its known time of appearance in Egypt. The cool shade and moisture of the place attract snakes; Attiya and I stepped on a whip-snake (identified from my description as *Zamenis sp.* by Mr. G. W. Murray) which was basking in a patch of sunshine. In the confusion of the moment we killed this specimen, which was probably harmless. It was 4 feet long and 1 centimetre in maximum diameter.

In addition to the usual desert birds (see Notes at end of the paper) a pair of Pale Crag Martins live here, and at the adjacent Bir Shetîun I found three small bird-traps, made on the system favoured by English boys—*i.e.* four flat stones set in a rectangle and a top slab "set" on a fragile stick. Attiya claimed them as the property of Ababda, who trap birds while they are grazing camels from Bir Shetûn as a centre. He assured me that the birds were kept alive and sold to dealers in the Nile valley, whence, no doubt, they find their way, dead or alive, into zoological gardens or collections.

High above the pool is a Coptic hermitage cut in the steep wadi-side; its sides are plastered and bear rough designs in colour, but it has been looted by treasure seekers, the designs are mostly obliterated, and the floor has been dug out.

It may be noted that the geological structure* which has given rise to Bir Shetûn has also rendered the wadi impassable to camels at this point. The water-hole can be reached from below, that is, from the Nile, or from above, from the central plateau, but it cannot be passed. To gain the Nile from above the well one may journey *via* Wadi Um Dud, the way we had come, strike across the plateau to Maragha (as Beadnell did), or go due south across the plateau almost to Gebel el Fahdi and enter Wadi Qasab, the course we followed. The grandeur of Wadi Qasab is unsurpassed, and I would describe it with enthusiasm had it not already been mapped far more accurately than by compass and notebook.

Lastly, I may add that this country at any rate is likely to be free from the all-conquering motor transport; and so its game—gazelle, ibex (Abadi-Arabic, *teytel*), and a few wild sheep (Abadi-Arabic, *kabsh*)—may live in comparative safety, immune from the unsporting methods of butchery adopted elsewhere. The Abadi, in common with most desert folk, has hunting methods of his own which are scarcely gentlemanly; but a good meal is not a common event in his life, so we may forgive him much that we would condemn in others.

NOTES

Birds

The birds most seen were the common black-and-white chats, which were usually in pairs, about three pairs seen a day. A single Hooded Chat was observed at Camp 33. About a couple of pairs of Finch-Larks were seen daily. A single Raven joined us at Camp 31 and remained with us till our departure from Camp 33, on which day a pair of Crows joined us for a few hours, but did not come close to us. A single Griffon Vulture visited us in the evening at Camp 31, perched on the top of the cliff for the night, and departed at daybreak. A single Partridge was put up in Wadi Shetûn. The guide and I were usually at least a mile or two in advance of the camels, and we invariably walked quietly with a view to watching animal-life; I was surprised that so few partridges were

*Bir Shetûn occurs at a somewhat lower horizon than Bir Um Dud, and is cut in the massive foraminiferal limestones of Lower Eocene age.

Fallen roof at lower end of canyon, Bir Um Dud

Bir Um Nabaga in Wadi Qasab

Carrying water-skins up cliff, Bir Shetûn

Bir Shetûn

seen. At Bir Shetûn a pair of Pale Crag Martins were established and seemed to spend the entire day flying silently up and down the narrow gorge in which the water-holes are situated.

Other notes on the fauna will be found in the text. I am indebted to experts at the British Museum for help in verifying my identifications made in the field.

Meteorology

Pressure: The barometer falls daily as the sun warms the surface air by radiation from the barren ground; it rises again towards nightfall, when the air becomes colder and denser. The total variation is about a fifth of an inch. Long series of readings were taken at most camps, at hourly intervals.

Winds: In the winter months there is a diurnal and prevailing north wind caused by the warming of the desert surface by the sun, the rise of the warmed air, and inrush of cool air from the Mediterranean to replace it. The wind gets up about 9–9.30 a.m. and dies away about sundown; it is less marked in cloudy weather (note: there is a change in the month of March, when hot winds start blowing from the south). Most nights are fairly still, and cold, but there are occasional gusty winds, particularly down the wadis from the plateau to the warmer Nile valley, with its cultivated land. By day occasional gusts of wind blow up the wadis (especially in the early part of the morning), to replace the air first warmed by the sun shining on the plateau, before the daily air current from the north is set in motion and overcomes local circulation. These winds enhance the interest in stalking birds and mammals, particularly ibex. The wadi-winds rush straight up or down the defile, "bumping" from one projecting wall to another where the wadi curves or meanders: it is a simple matter to sit out of the wind by the valley side, and "watch" it rushing by a few yards away. This is reminiscent of winds in fjords (*cf.* De Geer on winds from glaciers in Spitsbergen fjords, 'Miss. Suédoise. Mesure d'un Arc de Méridien au Spitzberg,' t. ii, s. IX, p. 36, published Stockholm, 1923).

Temperature: the midday maxima are not available as I was usually on the march at that hour; a minimum thermometer was always set at night; the temperature usually fell to about 1° C. above zero, but −1° C. was registered on a number of occasions; the lowest record was −2·5° C. at Camp 32. The presence of a layer of alto-stratus cloud kept the night-temperature well above zero, the warmest night having a minimum temperature of 7° C.

Wet and dry bulb readings were taken with a whirling hygrometer daily as soon after halting as possible: these bring out the interesting feature that the presence of a layer of alto-stratus cloud corresponded with a degree of humidity 10 per cent. to 20 per cent. higher than usual. The dry-bulb reading also gives some indication of day shade-temperature, but not at midday. Most days were cloudless, or with scattered fleecy cloud which had no effect on ground conditions.

The following table brings out the variation in percentage humidity mentioned above, and gives other data of interest:

Camp.	*Wet and dry bulbs, C.*		*Humidity per cent.*	
30 (*see map, p.* 147) 3.30 p.m. Feb. 7	14	19	54	Early cloud
31 3.15 p.m. Feb. 8	14	19	54	and mist
32 4.15 p.m. Feb. 9	12	18	44	Alto-stratus
34 12.15 p.m. Feb. 11	15	23	38	
34 2.15 p.m. Feb. 12	18	27	37	
35 W. Qasab: watershed: 3 p.m. Feb. 13 ..	16	23	44	Alto-stratus
36 W. Qasab–W. el Fahdi: 4 p.m. Feb. 14 ..	15	23	38	
37 Midway 36–38: 3.30 p.m. Feb. 15	15	25	28	
38 W. Qasab–W. Gahlani: 3 p.m. Feb. 16 ..	16	25	34	
39 Midway 38–Nile cultivn.: 2.30 p.m. Feb. 17	14	22	36	

Bir Shetûn

Carrying water-skins up cliff, Bir Shetûn

Archæological Notes

Archæology.—Flint implements: As in all the Egyptian deserts, Palæolithic implements occur on the surface of the Ma'aza Limestone Plateau, but along my route and in Qau bay they were remarkably scarce. Dr. Hume tells me that he found them occasionally on his traverse from Qena to Assiut. Between Camps 28 and 30 I found a few flakes of indeterminate age and two good Chellean *bouchers* (coups-de-poing), but no Mousterian flakes or cores. Of Upper Palæolithic age were two or three cores of *Sebilian* (*cf.* Capsian) type, such as are common in certain parts of Upper Egypt; these were found near the top of the ascent from Camp 28, and flaking sites probably of the same age were seen in the central hills of Qau Bay. Beyond Camp 30 I found no Palæolithic implements till we reached the lower part of W. Qasab. No implements of Badarian or Fayum type were found. Two or three flakes from near Camp 20 might be of Pre-dynastic age.

No flint implements of dynastic age were found, but two retouched pieces of tabular flint which I picked up on the plateau between Camp 20 and Bir Um Dud are of interest. Of these, one is like an adze, almost rectangular but slightly broader at one end, and the other is a "bellied" knife or chopper about 6 inches long. On both a minimum amount of retouching has been employed to obtain the desired result. Thus on the adze the cutting edge and the side-edges have been flaked at a high angle from one side of the tabular flint, a chopping edge and a "waisted" handle have been provided on the knife. There is much thermal pitting on the flat surfaces. In my opinion both are unskilled but effective copies of the dynastic tools found in the Nile valley, and of contemporary age. Both are patinated.

Pottery: Broken pottery is common along the important camel roads: during the march from Qau to the Nile *via* Bir Shetûn and Wadi Qasab I collected fragments which I submitted to Mr. and Mrs. Guy Brunton for identification, it being clear that we might learn something of the age of the routes by this means. The material was identified as exclusively "Arab," *i.e.* not earlier than the seventh century A.D. I found no pre-dynastic or dynastic sherds, nor Celadon or other oriental pottery which was imported *via* the Red Sea ports from an early date.

Cairns: The Arabs' direction posts—a block of stone set on end or two or three slabs piled up, rarely exceeding a foot or so in height—are common features on any camel route; but in the course of this march I noticed also a much more substantial type which occurs where the route runs over the plateau (*e.g.* near G. el Fertila, between the head of Wadi Um Dud and Wadi Shetûn, and on the high ground between Wadi Shetûn and Wadi Qasab). Mounds of limestone blocks, with few smaller stones, may reach a height of about 4 feet; sometimes they are spaced at intervals of 100 yards. Those in the last two localities were built of flaggy stone carefully arranged, and were tabular (now partly destroyed by Arabs or Ababda). They are distinct from any modern survey beacon and are evidently of very considerable age, though the pottery around them was Arab; they are quite "un-Arab" in appearance and structure, and recall the methodical workmanship of Roman times. In fact, they reminded me of the splendid cairns built by these people in Wadi Qena, *i.e.* from the Nile to W. Um Disi and into the Red Sea Hills. They are distinct from the piles of pebbles frequently seen along a camel route: as is well known, it is customary for any Arab passing such a mound to add a pebble to it, for religious or superstitious reasons.

The hermitage at Bir Shetûn has been noted.

THE CENTENARY OF THE BERLIN GEOGRAPHICAL SOCIETY

THE hundredth year of the existence of the *Gesellschaft für Erdkunde* was celebrated in Berlin from May 23 to 26 last, when the Royal Geographical Society presented a congratulatory address and was represented by Sir Maurice de Bunsen, Foreign Secretary, Dr. H. R. Mill, Vice-President, and Rear-Admiral Douglas, Hydrographer of the Navy. Professor Penck, the President of the Society, received delegations of geographical societies and oceanographical institutions from most of the countries of the world, and conducted a series of ceremonial, scientific, and social gatherings with characteristic cordiality. The attendance at the various functions varied from about 250 to over 400, and the occasion is said to have been the first completely international gathering held in Berlin since the war. The prevailing note was the universality of science and the duty, despite the memorial character of the celebration, to look forward to the future and let the dead past bury its dead. The order of precedence throughout was that of the date of the foundation of the societies represented, so that the French and British delegates were accorded the places of honour corresponding to the foundation of the *Société de Géographie* de Paris in 1821 and that of the Royal Geographical Society in 1830. The countries outside Germany represented by special delegates were Australia, Austria, Brazil, Bulgaria, China, Czecho-Slovakia, Denmark, Finland, France, Great Britain, Guatemala, Hungary, Italy, Japan, Latvia, Mexico, Netherlands, Norway, Peru, Poland, Romania, Sweden, Switzerland, Spain, Russia, the United States of America, and Yugoslavia.

On Thursday May 24 the first meeting was held in the fine house in the Wilhemstrasse, which has been the property of the Society for thirty years. Here the delegates were received by the Honorary President Dr. G. von Hellmann, the President Dr. Penck, and the Officers and Council of the *Gesellschaft für Erdkunde*. Each of the guests of honour received an official badge (bearing the design of the Society's medal and a white porcelain slip with the name of the delegate very clearly inscribed as a means of mutual introduction) and a memorial volume or *Festschrift*. At 4 p.m. on the same day a large and appreciative audience heard a lecture by Sir Douglas Mawson in English, illustrated by a magnificent set of slides and a coloured kinematograph film of extraordinary brilliance which he had recently had prepared from the negatives of the Australian Antarctic Expedition and now exhibited for the first time in Europe. The lecture was given in the large theatre of the new Langenbeck-Virchow-Haus, which was equipped with the latest devices for projection and instantaneous darkening.

In the evening the chief ceremonial function was held by permission of the German Government in the great hall of the Reichstag, which was filled to overflowing with delegates and members of the Society. Professor Penck as President, standing between the marble busts of Humboldt and Karl Ritter, gave a short address celebrating the formation, growth, and work of the *Gesellschaft für Erdkunde* and stressing the world-embracing sphere of geography and the results obtained by the recent concentration of German effort on oceanographical research. M. Charles de la Roncière, Vice-President of

the *Société de Géographie* of Paris, then delivered an address in French on the work of German geographers. He spoke on behalf of all the French-speaking delegates. Sir Maurice de Bunsen followed on behalf of all the English-speaking delegates, both British and American, in a short extempore address in English which was very heartily received. He recalled the fact that his grandfather was the first Honorary Member of the Berlin Society and was the patron of the famous Petermann whose experience with the great British cartographers of seventy years ago fitted him for his subsequent career at Gotha and the foundation of his *Geographische Mitteilungen*. He also referred to the many German geographers from Karl Ritter to Professor Penck who had received the medals of the Royal Geographical Society, and he remarked that if the *Challenger* Expedition had admittedly inaugurated the scientific study of the ocean bed, the recent voyage of the *Meteor* might well be held to open up a new era in this important branch of research.

Dr. Maull conveyed the congratulations of the Frankfurt Geographical Society—second in seniority in Germany—and Professor Meinardus those of the *Deutsche Geographentag*. Professor Otto Pettersson, speaking in German, conveyed the greetings of all the Scandinavian delegates, Swedish, Norwegian, Danish and Finnish. Speeches for other nationalities, for the German Government departments, and for the *Meteor* expedition followed in rapid succession. At the close of each address Professor Penck spoke a few graceful words of thanks.

The award of the Society's medals and other distinctions then took place. The gold Humboldt Medal was handed in sympathetic silence to the widow of Professor Alfred Merz, who died soon after the commencement of the expedition of the *Meteor*, which he had organized and was leading. The gold Karl-Ritter Medal was presented to Professor A. Hettner, of Heidelberg, and gold Nachtigal Medals to Dr. Karl Sapper and Sir Douglas Mawson. Silver medals in recognition of good work done and as an incitement to further achievements were awarded to Captain Spiess of the *Meteor* and Dr. Wüst of the *Institut für Meereskunde*, Dr. Lauge Koch, Captain G. H. Wilkins, Mr. W. R. Rickmers, and twelve other geographers of various nationalities. The only German to be made an honorary member of the Society had been Humboldt in the earliest years, and advantage was taken of this precedent to confer the same dignity on Dr. Schmidt-Ott, a Minister of the German Reich, in recognition of his services to the *Meteor* expedition. Diplomas of honorary membership were handed to Professor E. de Martonne of Paris, Professor E. de Margerie of Strasbourg, Sir Charles Close (*in absentia*), Dr. H. R. Mill, and six others, while a large number of foreign geographers were appointed corresponding members. The proceedings ended with a supper served at buffets in the lobbies of the House and eaten informally in groups at small tables, as was the old custom after the ordinary meetings of the Society.

On Friday May 25 the Oceanographical Conference, which was combined with the Centenary Celebration, began at 9.30 a.m. in the Langebeck-Virchow-Haus, when Dr. Schmidt-Ott, Chairman of the Emergency Fund for German Science which financed the *Meteor* expedition, opened an exhibition of oceanographical apparatus and of charts and diagrams setting forth graphically the main results obtained by the expedition. At a later stage the memorial

medal of the *Meteor* expedition was presented to Sir Maurice de Bunsen and Rear-Admiral Douglas, and others. The Conference held two sittings at which twelve papers were read, without discussion, most of them on the equipment and results of the *Meteor* in her South Atlantic cruise, but including a discourse by Dr. Defant on the systematic investigation of the ocean, papers by Dr. Helland-Hansen of Bergen on oceanographical research in small vessels, by Dr. Hjört of Oslo on the work of the International Council for the Exploration of the Sea, by Mr. P. M. van Riel of de Bilt on the plans of a new Dutch expedition to the seas of the Malay Archipelago, and by Dr. H. U. Sverdrup on the approaching seventh cruise of the American research ship *Carnegie*, which is to be mainly oceanographical. The sittings were separated by an official lunch to the more important delegates given by the Government in the Foreign Office, and the day concluded with a banquet given by the Society which was very largely attended. The great oval hall of Kroll's Restaurant was utilized for the dinner, Professor Penck presiding at the high table between M. de la Roncière and Sir Maurice de Bunsen. A message of greeting from President von Hindenburg was read and his health drunk with musical honours from an orchestra which played at intervals throughout the evening, and occasionally supplied an emotional background to the more moving passages of the speeches which were given between the courses.

On Saturday May 26 a technical meeting of the Oceanographical Conference was held in the forenoon, when several papers were read on the equipment and results of the German South Atlantic expedition in the *Meteor*. In the afternoon the City of Berlin invited the delegates to a pleasure excursion by motor coach through the Tiergarten and Grünewald to Wannsee, and a steamer trip thence on the beautiful Havel lakes to Potsdam. Foreign visitors owed a special debt for the ubiquitous presence and unfailing kindness of Dr. A. Haushofer, who ably seconded the officials of the Society in carrying out all arrangements.

The *Festschrift* produced in celebration of the Centenary is a handsome and well-illustrated volume of 560 pages. In the preface Professor Penk says :

"The span of a hundred years attracts one towards a retrospective treatment of the developments which it has witnessed, but the Council are of opinion that the publication of a history of the Society would in present circumstances be less useful than the preparation of a special volume of the *Zeitschrift*. In Germany this is not the time for festivities, and it is more important now to look into the future than to dwell on the memories of the past. A forecast of the future can only be made securely on the basis of the facts of the present, hence the decision of the Council to include in the special volume a selection of the work which the members of the Society find it practicable to carry on either by investigations into natural conditions or by literary researches into earlier results."

TWO MORE ANCIENT MONUMENTS IN SOUTHERN KURDISTAN

C. J. EDMONDS

IN the *Geographical Journal* of January 1925 I gave a short description of two ancient monuments in the Qara Dagh range of Southern Kurdistan. This great chain, running from north-west to south-east, suddenly disappears where it reaches the Sirwan river (Diyala of the Arabs). The parallel range on the north-east side, the Baranand, after being pierced by the Sirwan at Darband-i-Khan, swings round in a quadrant across the line of the Qara Dagh to a direction almost north and south, and is here named Qawala from the Sirwan to the Kargamil pass, Khoshik from the pass to the Haurain gorge, and Bamu from the gorge to the Hawwasan river (Arabic Abbasan). Though out of the straight line of the Qara Dagh it resembles that range in that it divides the oak-grown country on the north-east from the bare stony lands on the south-west. That part of Bamu which is in Iraq territory contains two more ancient monuments of some interest.

The first, a rock relief, is fairly well known and is situated high up on the mountain side in the gorge of the Shaikhan stream between the villages of Bailula and Darband. It is approached by a stiff climb, the last 30 feet of the ascent requiring considerable agility. It is possible, with some difficulty, to scramble on to a narrow ledge, and it was from this, when we visited the place in March 1926, that my companion, Mr. A. J. Chapman, secured the accompanying photograph, holding my vest-pocket camera out at arm's length and slightly to the side, to get the lens 3 feet from the carving. The picture is therefore rather foreshortened.

The carving represents a beardless figure, in rolled cap, looking to his left, a bow in the left hand, a sword or dagger in the right, a hammer in the girdle. It measures 34½ inches in height, *i.e.* about half human size. There are two smaller figures, not shown in the photograph, the first under the warrior's left foot, the second kneeling in an attitude of supplication before him. Behind the second figure is an inscribed panel, 17½ inches high and 2½ inches wide, in four columns. The figures are wooden and lifeless, in striking contrast to the tremendous vitality of the carving at Darband-i-Gawr. Some account of this monument is given by de Morgan ('Mission Scientifique en Perse,' tome 4, 1896), who considered that it might be the most ancient specimen of sculpture in Asia.

I happened to be in the same neighbourhood again in April 1927 and had occasion to spend a night at the camp of Usman Beg, chief of the Sharaf Baiani tribe, at Tappa Qalandar on the Hawwasan river. He then told me of another rock carving, of which I had never previously heard, situated just behind his village of Haurain and representing, it seemed, a hunting scene.

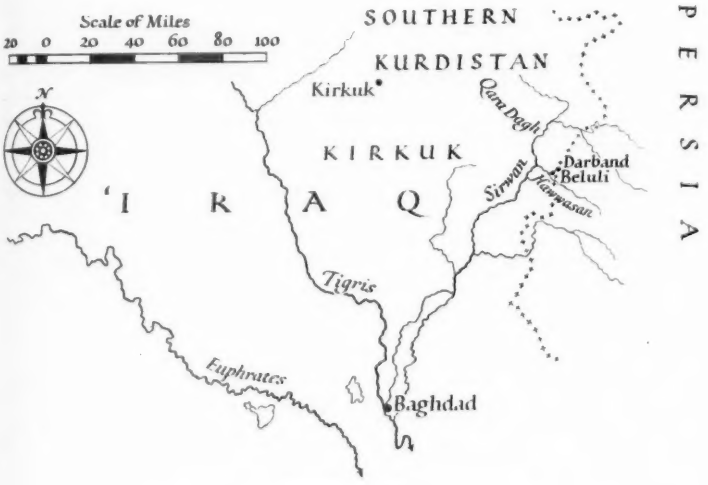
The road from Tappa Qalandar to Haurain follows a raised causeway, evidently artificial, flanked, as it approaches Haurain, by extensive stone débris, as of an ancient ruined city. The village was abandoned for the flea season, and we rode on up the gorge for about a mile until we came to a lofty detached rock with signs of a ruined fort, known to the Kurds as the castle of Yazdajird, on the summit.

Rock relief, Shaikhan gorge

Ibex carving, Haurain

The carvings proved to consist of eight or nine extremely primitive representations, cut in the rock, of ibex, varying in length from 9 to 18 inches, as it were a herd grazing on the mountain side. The bodies and legs are little more than straight lines, but the curve of the horns is very happy and gives unexpected life to the whole. A violent hailstorm with thunder was raging at the time, and I was lucky to get my photograph as clear as it is.

I am indebted to Dr. Speiser, of the University of Pennsylvania, to whom I showed the photograph, for pointing out that the ibex is a motive that frequently occurs in Elamite art, and that these representations have a remarkable resemblance to those often found on the earliest pottery from Susa (see 'Studies in Early Pottery of the Near East,' by H. Frankfort, M.A.). Dr. Speiser informs me that the two monuments here described and the relief at Darband-i-Gawr not far away are too primitive and distinct in character to be ascribed to the Assyrians. They may not improbably be the work of the Lullu (B.C. 2500–B.C. 700), whose south-western boundary was the Qara Dagh range itself, and whose country corresponded roughly with the present-day *liwa* of Sulaimani.



PACIFIC POLITICS

THE PACIFIC: A FORECAST. By Lieut.-Col. P. T. ETHERTON and H. HESSELL TILTMAN. *London: E. Benn Ltd.* 1928. 9×6 *inches;* 204 *pages, and illustrations.* 12*s* 6*d*

THE RESTLESS PACIFIC. By NICHOLAS ROOSEVELT. *New York: Charles Scribners' Sons* 1928. 9×6 *inches;* x+292 *pages; diagrams and sketch-maps.* 12*s* 6*d*

THE writers of 'The Pacific: a Forecast' have the advantage of extensive experience, Lieut.-Col. Etherton in China, east and west, and Mr. Hessell Tiltman in Australia. Traversing again and again the same ground and treating their subject from the conflicting points of view of the various great Powers concerned, they arrive at conclusions which, it is to be hoped, need not be accepted in all cases as inevitable. There are many passages expressive of a conviction that a mighty war for the domination of the vast area of the Pacific can hardly be avoided in a not distant future. They find no difficulty, indeed, in showing how discordant are the ambitions of the Powers mainly concerned, and how easy it might be to drift into war unless concessions of a far-reaching character are reciprocally made to avoid such a calamity. Japan, for instance, is presented to the reader, no doubt truthfully, as a country no less dependent on extraneous supplies for her very existence than the British Islands themselves. Whence will she derive her necessary imports? If from China, are they obtainable in sufficient quantities, and with sufficient regularity, without actual control or even possession by Japan of great areas in that country? If headed off from China she may cast a covetous gaze on the Dutch East Indies and even on Northern Australia. The conflict of interest between Japan and America is depicted in strong colours. Japan, as already indicated, requires a preferential and even a dominating position in China, while America has laid it down as the main principle of her policy in China that at all costs the "open door" must be maintained. These opposing demands may turn out to be incapable of peaceful adjustment, and the joint authors of the volume under review even go into considerable detail to forecast the probable progress and results of such a war. Japan in the end would, they think, inevitably be crushed; but only for a time. Her geographical position renders her by nature the preponderating Power in Eastern Asia, and she would resume by peaceful penetration a position of superiority in China even more marked than any she may have previously achieved by force of arms.

Reference is repeatedly made to the twenty-one points by the enforcement of which in the year 1915 China was reduced, they consider, to the level of a mere vassal of Japan. This is represented as the greatest of the mistakes committed by Japan in the past, without however excluding a good prospect of Japan realizing the advantages of a friendly China, united to her perhaps in the future by a consciousness of the greater advantages to be derived from a joint pursuit of the ideal of Asia for the Asiatics. A not unlikely outcome of existing rivalries might be an alliance between Japan and Russia to resist the pressure of the Western nations to which Russia can now be hardly regarded as really belonging.

Perhaps the two authors have allowed themselves to "forecast" too much.

Our thanks are due to another author who, within the compass of one moderately sized volume, succeeds in presenting a clear picture of the distracting conditions of the Far East at the present time. Mr. Nicholas Roosevelt may fairly claim to have accomplished this feat. In 'The Restless Pacific' he sets forth the momentous changes which have passed over those regions since

the closing years of the nineteenth century, and the varying attitudes which they have compelled the interested Powers to take up. Speaking with what looks like inside knowledge of his own country, he believes that she might have regarded almost with indifference such great convulsions as the Japanese wars of 1894–5 and 1904–5, the seizure of spheres of influence in China by the rival Powers, the Boxer revolt, the fall of the Manchu dynasty, and, in short, all the events which have combined to change the face of the political situation across the Pacific Ocean, had it not been for the compelling influence of two far-reaching events which between them entirely altered the American outlook. He refers, of course, to the acquisition of the Philippines from Spain in 1899, to the completion of the Panama Canal in 1914, and to the consequent appearance of the United States in the political arena as a world Power of the first rank, unable, even if she desired to do so, to abstain from taking a hand in developments in and beyond the Pacific. In those regions he regards it as axiomatic that British and American interests coincide in requiring the maintenance of the present distribution of power in the quarter of the globe of which he treats. Britain must continue to act as the guardian of the western, and America as that of the eastern, entrance into the vast area which is gradually taking the place of the Atlantic Ocean as the centre of world interest. Singapore and Panama give passage to the overwhelming bulk of the traffic in and out of the Pacific. Mr. Roosevelt is a believer in "real politic," and he holds that strong navies, both British and American, are needed to preserve this traffic from interruption. Moreover, not only material objects but the loftiest ideals are generally promoted by the possession of powerful naval forces. Without them, in Mr. Roosevelt's opinion, America, inspired by John Hay, must have failed in asserting her determination to oppose the dismemberment of China and to keep thenceforth steadfastly in view the maintenance of the open door in that country. Very naturally, then, her policy came to be directed against the creation of spheres of influence. In this policy she secured the sympathetic support of Britain, as well as that of the Great Dominions, Australia, New Zealand and Canada.

He uses no word of provocation against Japan, but he points out that Japan, by acquiring the ex-German islands north of the Equator, and by her possession of Formosa, is necessarily attracted more and more towards the south as the natural sphere of her future area of expansion. But Japan, he thinks, cannot but realize that a limit is placed to this tendency southwards by the mere presence of the British at Singapore and of the Americans in the Philippines.

The foregoing will perhaps suffice to show the general purpose of the volume under review. It contains much information in support of these views, besides statistical details showing the evolution which has taken place in world trade in a far-easterly direction. The author is a clear and forcible writer, little disposed to place reliance in pure philanthropy as a guide to political action. In the chapter on "Russia and Asia" an interesting disclosure is made. The author is enabled, on good authority, to state what was the agreed frontier in Manchuria as between Japanese and Russian pretensions over this Chinese country according to the terms of the Treaty of July 1907. It runs, according to this account, "from the meridian of Vladivostok west to the Sungari river, thence northwards along that river to its junction with the Nonni, which latter stream it followed to the mouth of the Tolo; westward up the course of the Tolo to its source, and from there straight west into Inner Mongolia to the longitude of Peking. North of this line Russia was to have a free hand, south of it, Japan." Possibly this line of partition still holds good so far as those two countries are concerned.

MAURICE DE BUNSEN

REVIEWS

PICTURESQUE ARCHITECTURE IN PARIS, GHENT, ANTWERP, Rouen, etc. Drawn from Nature on Stone by THOMAS SHOTTER BOYS, 1839. With descriptive notes to each Plate, and an Introduction by E. BERESFORD CHANCELLOR. *London: The Architectural Press* 1928. 12 × 10 *inches;* xvi + 114 *pages.* 60*s*

This volume forms a companion to the 'Original Views of London' published about a year ago by the Architectural Press, and includes Boys' earlier drawings made during his residence abroad. The original lithographs, after a short period of popularity, remained forgotten, until they began to be sought after by collectors, and are now almost unobtainable.

Boys belongs to that group of architectural draughtsmen of the early nineteenth century whose careful and beautiful work was overwhelmed by the introduction of commercial photography. At the age of twenty-two he went to Paris, where he came in contact with Bonnington, whose influence remains strong in all his he work, and, with the exception of one visit to Belgium, he stayed in France until 1834, when he returned to London. Here Boys worked with Hulmandel the printer, who was experimenting in lithography. For some unexplained reason, since Senefelder introduced chromo-lithography into this country the process has been looked down upon as unworthy almost of any but the commonest forms of commercial printing. It is only in the hand of an artist like Boys that the possibilities of the medium are fully realized.

The original Publishers' Introduction, which is reprinted in the present volume, claims with unwise enthusiasm the possibility of counterfeiting a variety of artistic methods, from oil painting to a crayon sketch. But fortunately the boast is not realized in the plates, which remain chromo-lithographs.

Topographically these continental views are less valuable than the London series, as most of the buildings remain much in the condition in which Boys drew them. Certain plates have a special interest, notably that of the Tower and Town Hall of Arras which were destroyed during the War. The Sainte Chapelle (one of the most beautiful of Boys' plates) shows the old buildings adjoining, since displaced by the Palais de Justice, and in the view of Notre Dame from the south bank of the Seine, the ugly flèche which replaced the one destroyed in 1787 has been omitted, for the present flèche designed by Viollet-le-Duc in 1859 was not yet built.

Boys had a highly developed dramatic sense coupled with accuracy of observation, and it is the costumes, the vehicles, and the general paraphernalia of everyday life a hundred years ago that give these pictures an increasing historic value. There is little difference between the traffic to-day in London and Paris, but in these pictures of Boys a century ago they were indeed foreign cities.

Mr. Beresford Chancellor's descriptive text to each plate conceals under a pleasant style a considerable amount of research. He has an enthusiasm for Boys and his work, and his enthusiasm is infectious. The Architectural Press are to be congratulated on the production of these plates, which give so close a rendering of the originals. The book should finally rescue the name of Thomas Shotter Boys from the obscurity into which it has undeservedly fallen.

LL. E. W.

INDUSTRY IN SWEDEN. *Stockholm: Federation of Swedish Industries* 1927. 9 × 6 *inches;* viii + 260 *pages; illustrations and sketch-maps*

The original work on which this volume is based was published in Swedish in 1926. The present English edition is slightly abridged. The statistics are

those of the original chapters on the various branches of Swedish industry, and comprise the greater part of the book. These are both historical and descriptive, and are well illustrated with maps and photographs. Geographically, the best chapter is a prefatory one by Prof. Gunnar Andersson, on Sweden's natural resources in relation to industry. He shows that in cereal growth Sweden cannot compete with lands with a more favoured climate, and that it is only from cattle that the agriculture of the country can contribute towards its exports, through butter and meat. It is however due to forest products that the Swedes are able to maintain a fairly high standard of living. Timber and timber products are much more important relatively to mineral products than they were sixty years ago. Another important chapter, by S. Brisman, deals with industry and means of livelihood. Altogether this is a valuable geographical work. R. N. R. B.

GUIDE ILLUSTRÉ DE LA POLOGNE. By Dr. MIECZYSLAW ORLOWICZ. Translated into French by Anna Domaniewska. *Warsaw: Ministère des Travaux Publics* 1927. 6×4 *inches;* viii+285 *pages;* 160 *plates and a map*

This admirable and comprehensive little guide, by the Director of the Travel Bureau of the Polish Public Works Department, tells the foreigner who visits Poland exactly what he is likely to want to know. The first five chapters are devoted to general information such as suggested itineraries, hotels and restaurants, travel bureaux, and a bibliography of works on Poland in foreign languages. The remaining seventeen chapters describe in detail the different districts of Poland which adjoin the railway, special chapters being devoted to Warsaw, Cracow, Poznan, Lwow and Vilna. There is a useful index and an adequate map in colour, ingeniously contrived to be detached from the book. O. R.

EASTERN MEDITERRANEAN LANDS. By Col. P. H. H. MASSY. *London: George Routledge & Sons* 1928. 9×6 *inches;* xii+261 *pages; map and illustrations.* 12*s* 6*d*

In this volume Colonel Massy has portrayed his wanderings through lands too little known with a vivid and humorous touch which makes his pages pleasant reading. He also imparts much first-hand information on the geographical, political and social conditions of the various races with which he came in contact both during his career as Military Attaché and Consul towards the close of last century and in the course of his more recent travels since the war. Throughout, his intimate knowledge of the prevalent languages has stood him in good stead. He mastered his Turkish at Constantinople in the days of Sir William White. For his knowledge of surveying he acknowledges gratefully the teaching of Mr. Edward Reeves, of the Royal Geographical Society. Thus equipped, and aided by a broad-minded outlook on the world and by a kindly spirit towards all kinds and conditions of men, he was enabled to penetrate into regions rarely, and some of them never, before trodden by an Englishman, sometimes with serious risk to life and limb. Such was a venturesome journey on which he embarked while Consul at Erzerum. At that time his principal duty was to watch, and as far as possible restrain, through a period marked with continuous massacre and outrage, the action of the dominant Turks against the helpless Armenians. For this purpose Colonel Massy proceeded first to Adana, and then, with a much wider area to control, to Erzerum, the centre of the territory inhabited by the unfortunate Armenians. Here, besides lending a helping hand to these, he applied his skill as a surveyor to mapping the country between his consular headquarters and the Mesopotamian frontier. His graphic account of this sixty days' journey (pp. 51–55) includes many interesting particulars on the Armenian and Nesto-

rian centres at Van and Kochannes respectively, and on the Kurdish regions about Bayazid. His descriptions are illustrated with photographs taken on the spot, of which the one of Mount Ararat (frontispiece) is among the best.

So far Part I, descriptive of wild mountainous tracts over much of which the ordinary traveller would find it difficult to follow the author, although he often mentions his wife and family as taking part in his expeditions. Parts II, III, and IV take the reader in all comfort by railway from the Suez Canal to Haidar-pasha, on the Bosphorus. The Great War was over and a new world had emerged, which the Colonel is well qualified to compare with the old, known to him twenty years before. He has much to say of the present aspect of Palestine, Transjordania, Syria, and the Turkey formed by the masterful hand of Ghazi Mustapha Pasha, whose stern features are shown in a good portrait. Colonel Massy marks out an itinerary which may be profitably followed with his very readable book in hand, for there is a good deal in it of history, both ancient and modern.

In Palestine and Syria the altered conditions are apparent on every page—in Palestine comfortable trains, hundreds of miles of new roads, law administered with impartiality, widespread facilities for education. Colonel Massy's happy nature manifests itself in a spirit of optimism, where ordinary people might well be discouraged. The religious life of Jerusalem, with its conflicting allegiances to many different creeds, is well sketched in, and well-known Biblical places are visited and described. Haifa, only fourteen hours by train from Cairo, is to be the principal new port. Jaffa, falling into picturesque neglect, is replaced by the neighbouring Tel Aviv, the Hill of Spring, with its assembly hall, schools, theatres and shops, and with its air of cleanliness and comfort. Leading on through Transjordania and the Druse country, the author introduces us to Syria, where the French have not yet met with entire success in carrying out their mandate. Beirut, Baalbek, Aleppo and Palmyra are interesting stages on the journey, and the Colonel finds time to visit the Seven Churches of Asia—a proof that the old roving spirit is still alive within him. His journey homewards (Part V) was through Greece and the Adriatic, and, with a happy quotation from Bacon's 'Essay on Travel,' he breaks off a companionship which his readers will find agreeable throughout. M. DE B.

IM NEUEN ANATOLIEN: REISEEINDRÜCKE. Von RICHARD HARTMANN. *Leipzig: J. C. Hinrichs* 1928. 9×6 *inches;* 148 *pages;* 32 *plates. M.*9

Few countries have altered more in the last few years than has Asiatic Turkey. Conditions are still difficult for the ordinary traveller in Anatolia: police regulations which necessitate permits for every journey, trains that are infrequent and slow, hotels that are few and dirty, food that is indifferent and expensive, all combine to keep the country closed to the tourist. Consequently few books have yet appeared giving an account of modern Turkey, and Dr. Hartmann's description of his tour in the spring of 1927 is thus of general interest. The author's route took him to the principal cities—Brussa, Eski-Shehir, Afiun Kara Hissar, Angora, Konia, Adana, and Smyrna. The descriptions which he gives of his journeys show that some progress has been made in the past year, though the dirty conditions so unpleasant in travelling the reviewer found but little altered in April 1928. Amongst the sixty-five illustrations from photographs are three showing mosques at Konia converted into military observation posts—evidence that the regulations against photography of such objects were not as stringently enforced in 1927 as in 1928. The future development of Turkey will be interesting; Dr. Hartmann's book is a picture of a country in the midst of change, and apart from its present interest is useful as a record of one stage in the

evolution of a nation. It is unfortunate that the description is practically restricted to towns and scarcely deals with the rural aspects of a country in which the development of agriculture must be the basis of future prosperity.

L. D. S.

SOLDIERING IN INDIA, 1764–1787. Extracts from Journals and Letters left by Lieut.-Col. ALLAN MACPHERSON and Lieut.-Col. JOHN MACPHERSON, of the East India Company's Service. Edited by W. C. MACPHERSON, C.S.I. *Edinburgh: Wm. Blackwood & Sons* 1928. 9½×6 *inches;* xxii+413 *pages; illustrations and* 3 *maps.* 15*s*

To students of the early growth of our Empire in India we commend these journals, recorded in the intervals of active military life during perhaps the most momentous period of that history, the latter half of the eighteenth century—the times of Robert Clive, Eyre Coote, and Warren Hastings. They are written in a plain, unaffected style by two soldier brothers, Allan and John Macpherson, whose high personal characters enhance the value of any evidence they supply in matters of historical importance. How strenuous were the lives of the military servants of the old East India Company will be strikingly apparent from a perusal of these brief records of constant campaigning and marches and countermarches of enormous length, lasting for weeks and even for months on end. For instance, Col. Upton's mission to Purandhar involved first a journey from Calcutta to Allahabad and Kalpi, which must have taken a couple of months, and then a march across practically unknown country that lasted two whole months; while the return journey across the continent *via* Hyderabad and Rajahmundry to Balasore occupied eighty successive marches, Calcutta being reached again in just under four months. From a geographical point of view the outward journey was important in that it followed previously unexplored routes between the Jamuna at Kalpi and the Narbada, a careful map of which, still preserved at the India Office, was drawn by the Rev. W. Smith, attached to the mission as surveyor. The fresh information contained in this map was utilized by Rennell in his 'Map of Hindoostan,' published in 1782. General Goddard, on his better-known march across this country three years later, followed a more easterly and more direct route as far as the Narbada. Similarly John Macpherson's record of his march in 1779 with Major Carnac's detachment intended for the support of Goddard is also valuable as perhaps the earliest account we have of troops marching as far as Sarguja through an unexplored portion of the highlands of Chutia Nagpur, which had not been visited by Rennell's assistant surveyors —Richards, du Gloss, and Carter—in 1766–70.

From an historical point of view Allan Macpherson's diaries are specially important for the information they contain of the incidents of the Rohilla campaign, which called forth such bitter invective from Burke in the course of the impeachment of Warren Hastings, and for details, hitherto not available in published records, of the negotiations between the Maratha ministers and Upton in the conduct of his peculiar mission as plenipotentiary in supersession of the Bombay Council.

John Macpherson joined the 89th, Hector Munro's regiment, in 1760, and fought with it on the Malabar coast in 1761. In 1764 he accompanied Munro to Bengal, fought under him in the crucial battle of Buxar, and was severely wounded in the first assault on Chunargarh a few weeks later. He next fought with Carnac against the Marathas, and later on with Peach in the Northern Circars. Unfortunately, he has left no records of these campaigns. Both brothers were signatories to the general letter of resignation submitted by the

officers of the 1st Brigade after the promulgation by Clive of the Directors' decision to abolish double *bhatta* (field allowance), and so were participants in what has been called the " White Mutiny " ; but their commissions were restored under the amnesty granted subsequently.

The journals illustrate many aspects of the military life of the times. Of special interest is the account of the " buying out " of Col. Chapman on his succession to the chief command in 1773. We have references to duelling, to " running the gauntlet," to army contractors and their ways. Col. Allan Macpherson gives us very interesting descriptions of the cities of Hyderabad and Cuttack in 1777, as well as a graphic account of a *sati* witnessed by him in 1776. Among other matters of general interest may be cited the particulars, with cost, of an officer's requirements for the passage to Europe when it lasted some six months, given on pp. 355–57, including no fewer than 20 pairs of sheets, 100 shirts, and other items in proportion ; also " 264 bhangies of Seetacoon water " ! With the exception of the ' Swinton Family Records,' published privately in 1908, which contain valuable records of Archibald Swinton's campaigns, we know of no other instance of the publication of such interesting contemporary journals relating to the military events of those stirring days ; and in the present instance we have the original documents adequately edited by the competent hand of a direct descendant who has himself had long and wide experience in the same Presidency. C. E. A. W. O.

WITHIN THE WALLS OF NANKING. By ALICE TISDALE HOBART. With a Proem by FLORENCE AYSCOUGH. *London: Jonathan Cape* 1928. 8×5 *inches; 243 pages; four plates and two maps.* 6*s*

Mrs. Hobart, the wife of an American business man in China, was one of the foreign community in Nanking which suffered so sorely at the hand of the Nationalist troops in March 1927. Her story opens at Changsha, in Hunan province, in June 1926, when, following a flood, the Nationalist soldiers took possession of the ill-fated city. In August she and her husband sought peace in Nanking. Throughout the winter the situation remained uncertain. In March Shanghai fell. Three days later the Nationalist troops entered Nanking. All hopes that the advancing army would respect the persons and property of foreigners were soon shattered, and Mrs. Hobart gives a very moving account of those eventful few days, during which many foreigners lost their lives. Mr. and Mrs. Hobart, with some fifty others, barely escaped from their house in time and were saved by the bombardment of the gunboats *Emerald* and *Noa*. The book is a personal record of a terrible experience, temperately and straightforwardly written, its very restraint strengthening it as an indictment of the communist influences at work in China to-day.

Mrs. Ayscough contributes a thoughtful foreword, giving a brief account of the Chinese social structure and showing that the present state of political chaos in China is largely the result of the collapse of that aristocracy of learning which represented the administrative system, and which was swept away by a single edict in 1905. O. R.

SAVAGE ABYSSINIA. By JAMES E. BAUM. *London: Cassell & Co. Ltd.* 1928. 8×5 *inches; 272 pages; illustrations.* 12*s* 6*d*

Dr. Wilfred H. Osgood, of the Field Museum of Natural History, Chicago, who recently led an expedition to Abyssinia to collect museum specimens, has expressed the opinion: "Abyssinia is by all odds the most important and interesting part of the world left to be investigated, speaking from a natural-history standpoint. Very little—almost nothing—is known of its faunal life." (Yet, be it remarked, apart from Egypt, probably no other African country has so extensive

a literature.) It must be confessed that the author, who acted as "historian of the expedition," adds not a great deal to our knowledge of the fauna of that "savage" African country, nor any photographs of the beautiful antelopes the party were in search of. The five enthusiastic collectors made two interesting trips from Addis Ababa (which the author calls "Addis"), occupying some seven months in all. They met with courteous assistance from Ras Tafari and the provincial governors, and willing help from the natives generally. Their first trip was to the Jumm-Jumm forest in the province of Sidamo and through the Arrusi country to the Wabi Shebeli with the special object of obtaining nyala, after which they journeyed through Gojjam to the mountainous region of Simien, the almost inaccessible home of the Walia ibex. These two varieties of antelope are found only in Abyssinia, yet the photographs in the book do not include one of them. The collections amounted to some 3800 specimens in all, including birds and small mammals. One cannot help feeling some sympathy for the beautiful and inoffensive victims who were shot, and some may question whether there is any more justification for such wholesale slaughter when carried out in the name of science than when the motive is to gratify the ambition of an individual collector. In the Arusi trip the party "discovered" a river, already marked on the maps with the name Shanane; and they thought this discovery justified them in giving it an American name—"Davies river"—after a museum director. They also persuaded the "baron of Simien" to give his mountain stronghold an American name; but it will be interesting to learn if Dejasmatch Ayalu treats this as anything more than a joke. Abyssinian politeness is proverbial, and he could not refuse to comply with so modest a request. Throughout the book the author does not give a single date, though it would appear, from indications elsewhere, that the journey must have been made in the winter of 1926–7.

F. A. E.

KENYA FROM WITHIN: a short political history. By W. MACGREGOR ROSS. *London: George Allen & Unwin* 1927. 9×6 *inches;* 483 *pages, and illustrations.* 18*s*

KENYA DAYS. By M. ALINE BUXTON. *London: Edward Arnold* 1927. 9×6 *inches;* vii+211 *pages, and illustrations.* 12*s* 6*d*

Many of our countrymen who give any thought at all to Kenya regard it as a newly developed African pleasure resort, the wealthy big-game hunter's paradise, where to the pleasure of killing a variety of undomesticated creatures from the elephant downwards can be added the amenities of a hectic social life. Others think that far too much attention has been paid to the affairs of one of the least important overseas possessions of the Crown, as indeed it is, regarded from the standpoints of population and world commerce. Yet it is no exaggeration to state that no part of the British Empire gives more anxiety and is of more interest to those concerned with colonial affairs. A comparatively insignificant tropical colony has become the most significant in the strategy of inter-racial relationships: it is the scene of a new conflict between the protagonists of the old and new conceptions of Imperial policy; it is the field of a determined experiment in the colonization of the Tropics by white people.

Mr. Macgregor Ross went to British East Africa in 1900 and retired in 1923. For eighteen of these years he served Kenya as its Director of Public Works, and for six years was a Member of the Legislative Council. The scope and nature of his duties brought him into more intimate contact with all elements of the population than possibly any other contemporary servant of the Crown. He has had the further inestimable advantage of a scientific training, and has brought the habit of thought inculcated by such a training to bear upon the

problems facing the administration. And he has kept a diary. His experiences, his industry and skill have enabled him to compile a historical record of the first importance. There are some who will consider his book an indictment of our administration in Kenya, and such it certainly is, though the subject is too controversial to be discussed here. Suffice it to say that familiar as are the charges made, this is the first time they have been so amply documented. Nevertheless, Mr. Ross is not unduly pessimistic about the future of white settlement in the Tropics. He postulates certain conditions for its success in Kenya. There must be an end to compulsion, direct or indirect. The natives must be free, their goodwill and that of the Indian and Arab communities must be obtained. The franchise must be modified so that it will be acceptable to all alike. " The form that is good enough for the Europeans sets the standard of what will be accepted, without demur, by the other groups : just that—and nothing less." To secure cooperation and friendship between the differing racial groups equality of opportunity and equality before the law must be made a reality. Truly, as Mr. Ross remarks, this would be an adventurous experiment, but some will think the situation sufficiently perilous to the Empire as a whole to justify such an adventure.

Tolerance, breadth of view, clear vision, an impassioned belief in the good faith of his own countrymen—these are the qualities which Mr. Ross brings to bear on the problems of Kenya in the most comprehensive study which has yet been given to the public. It is a great pity that the general effect is marred by an egotistic outburst in one chapter. The volume can be heartily recommended to the earnest attention of all students of colonial development.

Those who are interested in the life of white settlers and the British official classes in the Colony and Protectorate may find Mrs. Buxton's book interesting. It is an unpretentious account of her personal experiences as a resident and traveller in the territory, and deals with those aspects of life there about which the would-be settler or visitor wishes to be informed. It is slight and commonplace when compared with the recent volumes by Dr. Leys, Major Orde-Browne, and Mr. Ross. It challenges none of our cherished beliefs in our essential superiority over the other races, and makes no attempt to set forth the fundamental issues at stake. A. G. C.

AFRICAN JUNGLE LIFE. By A. RADCLYFFE DUGMORE. *London: Macmillan & Co.* 1928. 10×7 *inches;* viii+246 *pages; illustrations.* 15*s*

This is not a work of sporting experiences, but one which depicts in a charming manner the life-histories of the largest animals of Africa. Five of these creatures, the elephant, black-maned lion, buffalo, rhinoceros, and giraffe, tell the story of their chequered lives. We learn the chief facts in their jungle existence—their huntings, their matings, the birth of their offspring, their seasonal wanderings, their struggle for food, the care of their young, their relations with other animals and, above all, with their greatest enemy—Man. It is all told from the animal's point of view. Indeed, it may be thought that the author is too daring in the extent to which he humanizes the beast. For these histories are not plain statements of habits; on the contrary, they are vivid psychological studies in which the animals express their thoughts and feelings. They tell of their fears and hopes and suspicions, how they form resolutions, reach conclusions, experience wonder and disgust. Some naturalists distrust this anthropomorphism, but it certainly adds to the charm of these histories.

Perhaps the most prominent feature in the book is the relation which these animals bear to man. It is interesting to attempt to see things from the animal's standpoint, and to learn what they feel when encountering motor cars or when

disturbed by a photographic flashlight. The naturalist will be impressed by the prominence of scent as the main guide to these creatures' activities, also by the author's rather strong views on the current theory of protective markings. One last point deserves special mention, the reproduction in the book of eight of the author's beautiful paintings. R. W. G. H.

A HISTORY OF SOUTH AFRICA. By ERIC A. WALKER. *London: Longmans* 1928. 9×5 *inches;* xii+623 *pages; and maps.* 12*s* 6*d*

A book which gives an adequate outline of the history of South Africa in some 600 octavo pages of good-sized type is something to be prized. Mr. Walker, who is Professor of History in Cape Town University, is to be congratulated on having done this, and in having done it very well. His book is packed with facts and dates, but is no dry chronicle, for the author has an incisive and picturesque style and writes with the utmost clarity. South Africa is treated as a whole, and while there is no great insistence upon geographical factors they are not forgotten. They are however mostly in the background of the picture. In the forefront is placed (what histories of South Africa have often tended to minimize) the conflict between black and white; a matter which is of growing gravity, as white South Africans at last begin to realize also. Mr. Walker says, indeed, that all the essential problems which have vexed South Africa were present before the first occupation of the Cape by the British. This is a good deal more than half true, though on the surface the history of the country for full a century appeared to observers to be largely that of the struggle between the Dutch and British colonists.

The author has tried to deal impartially with controversial points, and he nearly succeeds. Something of a bias against capitalists and "imperial expansionists" may be detected. Of inaccuracies, so far as can be judged, there are very few. But Mr. Walker is wrong in saying that the cost to the British taxpayer on the transfer of Rhodesia was £3,750,000. It was £1,750,000, for Southern Rhodesia promptly repaid the Treasury £2,000,000, while the smaller sum included the satisfaction to the Chartered Company for the rights acquired by the Crown in Northern Rhodesia.

Mr. Walker makes constant reference to his authorities in footnotes, and he collects these references at the end in a valuable "select bibliography" of original sources. The pages have side entries giving the dates when the events chronicled happened, and a series of sketch-maps shows South Africa (or parts thereof) at various periods. One at least of the maps might be more informative. That called the "Economic Map of the Union" marks only mineral products, and strangely enough "coal" not "gold" is printed under the name Johannesburg. While the author provides the student with all the apparatus he needs for further research the general reader will find this record sufficient for most purposes, and it will give him the true atmosphere of that land of violent contrasts—physical and racial—South Africa. F. R. C.

OREGON GEOGRAPHIC NAMES. By LEWIS A. MCARTHUR. *Portland, Oregon* 1928. 9×6 *inches;* xii+450 *pages; illustrations and maps.*

This careful compilation is arranged in the form of an alphabetical list of some 2300 names, each with an account of its locality and origin. The author has accomplished a great work for his State; but few of the names have more than a local interest. In his preface he estimates that about a quarter of them are of Indian origin; and there is a useful little appendix of Chinook Jargon names with their meanings.

It is unfortunate that nothing certain is known of the derivation of the fine-sounding name Oregon itself. It first appears in the forms Ouragon and

Ourigan in petitions made in 1765 and 1772 by an English officer named Rogers, who was stationed in the upper Mississippi valley and wished to explore the country to the west. In 1778 Jonathan Carver, who had been associated with Rogers, published his ' Travels,' in which Oregon refers to the Columbia river ; but the name was not known in 1792 to Vancouver nor to Captain Robert Gray of Boston, who called the river Columbia " for his ship " (note the transatlantic use of the preposition, now usually replaced on this side by " from " or " after "). The various Spanish derivations suggested from time to time : Aragon (synonym of Spain), oregano (marjoram), oreja (ear, from the big ears of the natives), orejon (slice of dried apple, from the appearance of the ears), oye agua (hear the water), are far more improbable than the word ouragan (storm), which may have originated from one of the early French explorers, whose records were consulted for Carver's book.

With regard to the " English " names, it may come as a surprise to many that such appellations as Dead Horse Canyon and O K Gulch are not merely inventions of Hollywood. Some names like Bug Butte and Ropers Bunion might well be improved upon. There actually have been attempts to change Louse Creek to Grouse Creek ; to the author " there does not appear to be much steam behind such movements," but to us an attempted compromise is suggested by Grouslous Mountain. It was a wise decision of 1857 to discontinue the name Jennyopolis. J. H. R.

JUNGLE PATHS AND INCA RUINS. By W. M. McGOVERN. *London: Hutchinson & Co. Ltd.* (1927). 9×6 *inches;* 382 *pages; sketch-map and illustrations.* 21*s*

This book is a narrative of a journey made by Dr. W. M. McGovern across South America during 1925–26. The whole expedition was divided into two separate parts. Briefly outlined, the first journey was up the Amazon from Pará to Manáos in a Booth Line steamship, a trip which is now very popular. From Manáos the Rio Negro was ascended to Sta. Isabel and São Gabriel; next the Uaupes river was followed upstream past Ipanoré and Yawarete, whence a diversion was made up the Papori river, whose northern tributary, the Maku igarape (or Pogsa), was also explored with the object of visiting the very shy and primitive Pogsa tribe. When the headwaters of the Papori were reached, it was necessary to make a long and difficult overland traverse, which brought the party to the headwaters of the Pira Paraná (Fish River). After travelling down this river the Apaporis was reached and was followed to its junction with the Yapura, where contact with civilization was reestablished. The rest of the journey back to Manáos was by steamboat, and this completed Dr. McGovern's first programme.

During this extensive and often arduous journey, thrills were not lacking and some new ground was explored, as, for instance, during the Papori–Pira Parana traverse and the short trip up the Maku igarape. Otherwise most or all of the area covered had already been explored, in 1903–5, by Dr. T. Koch-Grünberg, whose still more extended journeys have proved so profitable to ethnological science. Dr. McGovern came into contact with many interesting and primitive tribes, as yet but little affected by the influence of higher cultures. The Tucanos (of Betoyan stock) and the Tarianos (of Arawak stock), of the Rio Negro and Uaupes, are curiously patchy in their distribution, and the author has much to say regarding the ethnic distributions and migrations in the region. Complex conditions arise from intermarriage between the two ethnic stocks. Some interesting though not very detailed information is given about the customs, dances, and ceremonies of these tribes. The still-surviving use of stone implements in some districts is noteworthy. On the Papori the Waikano (Betoyan)

predominate. Owing to its habit of living hidden away in dense jungle and far from the river-banks, the Pogsa tribe appears to be almost unknown. Its very rudimentary culture would well repay investigation.

The journey gave a great opportunity for scientific ethnological observation, and it is to be hoped that the author, who scoffs at "our much-vaunted science of anthropology," may at some future time throw light upon some of the knotty problems to which he refers in the present volume, but which he himself has so far failed to solve. This section of his book may be regarded as a readable narrative of an interesting journey, attractively written, but aiming little at satisfying the demands of science. It is to be hoped that the author has much detailed material in reserve, which he will later produce to supplement his popular and rather sketchy narrative.

Occasionally he describes in some detail certain culture items which he noted, such as native dances and festivities, the huge *malokas* (communal dwelling-houses), etc., and mentions facts which are of ethnological importance; he also endeavours to interpret the significance of certain rituals and ceremonies, though long residence would be essential for accurate diagnosis of their meaning. Many of his briefer statements would acquire a value if some details could be given; for instance, his reference to simple palmwood blow-guns among the Palenoas "through which a hole had been bored," would have added interest had he described the process of boring (a method of blow-gun making which must be rare in South America). On referring to dolphins (p. 275) he says, "From time to time others stuck their heads above the surface of the water, and peered at us full of curiosity." Such behaviour in cetacean circles, and particularly among the fluviatile dolphins, has not come within our experience of these animals either on the Brahmaputra or on the Amazon. Has the author possibly confused the dolphins with the *Manati*, which has this habit? He also refers (p. 34) to the "*jaribu*" (*sic*) "or Amazonian heron," whereas the *jabiru* is far more nearly related to the storks than to the herons. To the general reader, however, these points may not be of much concern.

The second journey had a different object—to see something of the pre-Spanish culture remains of Peru and Bolivia. This involved a journey from Manáos to Iquitos (the capital of Loreto); thence up the Yucayali, a ten days' trip in a steam launch to the Pachitea, which was followed upstream to the mouth of the Pichis. Here canoes were resorted to, and the party arrived at Jessup at the foot of the Andes. The route over the Andes to Lima and on to Cuzco is well and amusingly described. The travellers proceeded to Lake Titicaca, La Paz, Tiahuanaco, and to the coast at Antofagasta. This second journey deals for the most part with well-known scenes and more prosaic methods of travelling than the first, and the author's survey was hurried. Still, he discusses several of the culture-problems interestingly and often suggestively, and urges that some current theories as to the relative dating and interrelationship of the various phases of Peruvian culture require revision. Unfortunately, he rarely quotes his authorities, and the whole book is marred by lack of maps (the one at the end is without value) and appears to be intended solely for the desultory reader. There is no index, and the "Table of Contents" consists merely of a series of catch-titles to chapters. Dates are rarely given. The illustrations are good, though too many are purely of personal interest and one would have welcomed more instructive pictures in their place. There must be abundant material, since the author was accompanied throughout his journey by a photographer, Mr. Männling. We hope that Dr. McGovern will draw upon his store of notes and photographs and publish fuller details, a desire for which is stimulated by his present narrative.

H. B.

REPORT OF THE SVALBARD COMMISSIONERS CONCERNING the Claims to Land in Svalbard. *Text, Parts I and II*, 32 and 20 pages. *Copenhagen* 1927. *Atlas, Parts I and II combined, Oslo* 1927

By the terms of the Spitsbergen Treaty of 1920 the sovereignty of Spitsbergen and Bear Island passed to Norway. All claims to land were to be examined and if possible decided by a Danish Commissioner. In default of a settlement rival claims were to be put to a tribunal at Copenhagen for arbitration. The Treaty came into force in August 1925, and a month earlier Dr. K. Sindballe was nominated commissioner. Twenty-six claimants of six nationalities submitted claims to 75 areas. Many of these overlapped. Thanks to the good offices of Dr. Sindballe, who arranged informal meetings at Oslo and Copenhagen for the purpose, all disputes were settled in a friendly way and no case required formal arbitration. This report defines the exact boundaries of the claims now established to which title-deeds have been given by the Norwegian state. They comprise 1629 square miles (including 68–75 square miles in Bear Island), or about 6 per cent. of the total area of the archipelago. Of the total square milage British companies own 410, Norwegian 857, Swedish 296, Dutch 48, and Russian 18. All German and most Russian claims were withdrawn. Most of the claims lie on Icefjord, in the area between Icefjord and Low Sound, and in King's Bay. Only one small claim lies on the east coast, and there is none on the north. All the coal-bearing land is now allocated. It is curious to note that the Cape Thordsen peninsula which has been claimed time and again since 1872, is now finally abandoned. The fee payable on submitting claims to the Commissioner being proportional to the area, much pruning resulted. The boundaries are described and the maps prepared by the organization "De Norske Svalbardekspedisjoner" under the direction of Dr. A. Hoel.

The atlas contains 34 maps on a scale of 1/50,000 showing the areas of the estates. It does not claim to embody new survey work, but only on two maps is the source of the material noted. Further detail in Gips and Ebba valleys, and other names, might have been taken from the surveys of Mr. J. Matheson. But the atlas serves its purpose. It does however bring to notice the unfortunate practice of translating place-names. This is an innovation in Norwegian maps of Spitsbergen. It was not adopted in the official Norwegian chart of 1919 (Norges Geografiske Opmaaling) nor in Major G. Isachsen's maps of North-West Spitsbergen published in 1915. But now such names as King's Bay, Safe Harbour, Low Sound become Kongsford, Trygghamna and Lågfjord. Confusion is bound to result, while the substitution of *fjord* for *bai* is surely unnecessary. Recherche Bay becomes Fagerfjord, a translation of the old Dutch name of Schoonhaven. Quite rightly Training Squadron Island or its equivalent is replaced by Reinholmen (Rheen island). Phantom point is translated to Skrymtodden, although the original Phantom was a Norwegian vessel bearing that name. Even worse is the alteration of some names. There is no call to disguise the well-known Klaas Billen Bay as Billenfjord, to transfer Gipshuken from a cape to a mountain, or to substitute Sindballe for Temple on a mountain in a region that has been carefully surveyed and adequately named. It seems a pity that the excellent work which the Norwegian Spitsbergen expeditions are doing should add to the confusion in Spitsbergen nomenclature which is already considerable. R. N. R. B.

ADVENTURES IN THE BIG BUSH. By C. G. LANE. *London: Hutchinson & Co.* 1928. 9×6 *inches;* 287 *pages, and illustrations.* 18*s*

What Gilbert White did for Selborne Mr. Lane has attempted in this book for a much larger and almost unknown region in Australia. Difficult as the

task is, he has been by no means unsuccessful. Indeed, in utilizing to the full the advantage he had in studying the character and ways of native folk, he has added a note that White could not give us; while in describing the peculiar scenery and the equally strange animal and vegetable life, he shows the born naturalist's passionate love of nature, an intimate association amounting to a kind of identification of the man with the living things he meets on his wanderings, and, above all, an eye for what is picturesque and pleasing. In style, however—in sentence structure and in the choice of words—this book falls far short of its illustrious prototype. It almost jars in places.

Mr. Lane knows his region well. He has rambled in it under constant camping conditions, far and wide, hither and thither as fancy led him, and his book is a reflection of this life. The reader who expects to find in it any definite plan will be disappointed. We are taken from one thing and one incident to another on a kind of butterfly excursion; and herein lies the charm of the book, which contains so many of those touches of nature that make the whole world kin, following upon one another with all the delightful unrelated order of childhood experience.

With his keenly sympathetic nature it is perhaps not surprising that Mr. Lane should have discovered many fine points in the North Australian natives, and have been able to give us a convincing account of them which is far more appreciative than those current for Australian natives as a whole. E. W. S.

INTERNATIONALE STUDIENGESELLSCHAFT ZUR ERFORSCHUNG DER ARKTIS mit dem Luftschiff (Aeroarctic). (*Petermanns Mitteilungen*, Ergänzungsheft 191.) *Gotha:* 1927. 11×7 *inches;* vii+115 *pages, and maps.* *M.*20

ARKTIS. Heft 1/2. Vierteljahrsschrift der Internationalen Studiengesellschaft zur Erforschung der Arktis mit dem Luftschiff. Hrsgb. von Fridtjof Nansen. *Gotha: J. Perthes* 1928. *Annual subscription M.*16

These two publications constitute a new development in the study and treatment of polar problems: they indicate, in fact, the commencement of a programme of international cooperation planned by its authors on a scale and with an enthusiasm as great as that of 1882. The first, issued in 1927 as a Supplement to *Petermanns Mitteilungen*, is edited by Dr. Leonid Breitfuss, and consists mainly of the papers read at the first congress of the new society held in Berlin in 1926. *Arktis*, on the other hand, will appear regularly four times a year, with Dr. Nansen as editor-in-chief; Dr. Breitfuss' name appears as one of the editing committee; and there is also an international advisory committee represented from this country by Dr. Mill. These names are sufficient to indicate the importance of the new work and the sound lines on which it will be conducted. *Arktis* has the same general format as *Petermanns Mitteilungen*, but is printed on different paper and with a closer arrangement of type; these differences are sufficient to make it more difficult and tiring to read, and one hopes that it is not too late to ask for an improvement in this respect in future numbers.

Among the nine articles in the first issue (a double number, as it happens) attention may be more particularly directed to a detailed summary by Professor Samoilovitch of explorations carried out since 1921 in Novaya Zemlya and the Barents Sea under authority of the U.S.S.R. This, as well as one of the other articles (also by a Russian), is written in English. On the other hand, Dr. Gain's account of Antarctic animal life is in French. The latter article also indicates that the periodical will deal with both Arctic and Antarctic. Polar travellers and writers may therefore look forward to possessing a publication

which will keep pace with the great mass of research and the rapid economic developments going on in these regions.

Arktis, it may be added, is the official quarterly journal of the International Society for Arctic Research by Airship. The present number therefore summarizes the scope and aims of the Society, and ends with details of the programme of the second congress held in St. Petersburg in June of this year.

J. M. W.

GRUNDZÜGE DER PHYSISCHE ERDKUNDE. By A. SUPAN. Seventh Edition. Edited by E. OBST, with the collaboration of K. Brüning, W. Georgii, G. Schott, F. Machatschek, E. Leick and F. Pax. Vol. I. *Berlin and Leipzig: Walter de Gruyter & Co.* 1927. 10×7 *inches;* x+495 *pages;* 5 *coloured plates and* 113 *figures in the text. M.*22

Supan's 'Grundzüge der physische Erdkunde' was first published in 1884. As it passed through successive editions it was the author's constant endeavour to improve its form and to incorporate all important additions to our knowledge, and long ago his book took its place as one of the best and most complete surveys of the subject in any language. With his wide knowledge and his experience as editor of *Petermanns Mittheilungen* for many years, Supan was exceptionally fitted for the task, and in spite of the rapid growth of all branches of the science, the sixth edition, published in 1916, which was the last that he lived to see, was still as accurate and well-balanced a survey of the whole subject as the earlier issues. But no one knew better than he that any later edition would require considerable changes; and, as he felt his end approaching, he asked Professor Obst, if he could, to carry on the work of revision and continue the existence of the book. In a very modest preface Professor Obst tells how he tried to comply with this request and at length prepared a draft; but he was not satisfied. Reluctant though he was to divide the honour of producing a new edition of so famous a work, he came to the conclusion that by himself he could not maintain the high standard that Supan had set. Supan had grown up with the science and was equally familiar with all its branches. The younger generation was born into a science already grown, with its branches highly specialized. To a great extent they must be specialists themselves, and it would require the co-operation of several writers to produce a treatise with the scope of Supan's 'Grundzüge.' To call in the help of others was to lose the unity of the original work, but it would be more serious still to lose its accuracy and completeness.

Accordingly, the seventh edition is a joint work, under the general editorship of Professor Obst. For convenience it is to appear in two volumes, of which the first is before us. The editor hopes to keep the whole work within its former limits; but, to judge from the first volume, it seems likely that some increase in size will be necessary.

The original scheme of the work is retained, except for some changes in the arrangement. There is now, for example, a special section, about 120 pages in length, upon the waters of the land, including groundwater, rivers, lakes, glaciers, but leaving their geological effects for a later section. In all sections there are naturally very considerable changes in detail, in order to bring the book up to date, but the collaborators have endeavoured to keep the spirit of Supan. We are told, however, that the sections on animal and plant geography, which fall into the second volume, have been entirely re-cast.

Professor Obst has been fortunate in his choice of collaborators. In the present volume the section on the Earth as a whole is by himself and K. Brüning, that on the atmosphere by W. Georgii, the section on the ocean is by G. Schott, and that on the waters of the land by F. Machatschek. In the forthcoming

volume ii the land is dealt with by the editor and K. Brüning, the geography of plant-life by E. Leick, and the geography of animal-life by F. Pax. In spite of the divided authorship and the numerous changes required by the development of the science, the character of the work is preserved and it remains worthy of its name. No higher praise will be desired by the editor and his coadjutors.

The book is well produced, the text, figures and maps being clear and easy to read. Since all good atlases include maps of isotherms, isobars, etc., such maps have been omitted; but where recent work has introduced important changes, as in the case of ocean depths, a map is given showing the results as far as possible.

P. L.

ALLUVIAL PROSPECTING: THE TECHNICAL INVESTIGATION OF Economic Alluvial Minerals. By C. RAEBURN and H. B. MILNER, with a Foreword by J. D. Falconer. *London: Thos. Murby & Co.* 1927. 9×6 *inches;* xix+478 *pages;* 139 *figures;* 32 *plates.* 35*s*

In two ways this book is indicative of the progress of the times. In the first place its authorship represents the combination of the "practical" man with experience in such distant fields as Spitsbergen and Nigeria, and the "academic" geologist speaking with the wealth of experience gained in years of laboratory research. In the second place it treats scientifically of a subject which was, until quite recently, essentially the field of the old type of prospector, who relied upon the evidence afforded by his washing-pan to his unaided eyes, and corroborated by a few simple rule-of-thumb tests. Man has been, since his earliest days, an alluvial miner, and alluvial mining of such minerals as tinstone and gold remains of very considerable importance in the economic life of the world to-day. Consequently there is need for a book like the one under review, which deals very fully with alluvial deposits and alluvial prospecting.

The authors consider first the classification, lithology, mineral constitution and modes of accumulation of alluvial deposits, and then proceed to deal with prospecting methods, passing on to the examination of concentrates in field and laboratory. The latter part of the volume, occupying more than a hundred pages, is devoted to a well-illustrated series of systematic descriptions of alluvial minerals.

The authors cover their subject in a clear and efficient manner, and have produced a text-book for the rising generation of prospectors which is far in advance of any previously available on the same subject. At the same time we believe that the book, unless judiciously used, may do considerable harm. It may be true that "the old prospector with his rule-of-thumb methods, . . . with changing conditions . . . has had to be replaced," but the traveller may still make discoveries of the utmost importance to science and probably of the greatest economic value with but a small fraction of the equipment listed as "essential." The list given for the simple prospector's outfit "not intended to be fully comprehensive" includes more than 65 items. We read that the prospector should have "Hammers, one 7 lbs., several about 3 lbs., a few for trimming." Actually the experienced prospector, like every explorer, will think of the days when he may, with difficulty, be able to secure the services of but half a dozen porters for the whole of his effects, and will learn to rely on a single, well-tried hammer suited to his particular needs. And so with the other items of the prospector's outfit. Whilst recommending this volume to the geographer desirous of making useful observations on alluvial deposits in the course of his explorations, it is necessary to emphasize the need of distinguishing between the essential and the non-essential. It is not suggested that any part of this well-arranged book is superfluous, but merely that the explorer may yet do work of great value with less elaborate equipment. A few years ago a well-known oil company engaged

a young geologist, trained in modern methods of study of alluvials, to investigate certain oilfield problems. After some months' work, he showed very conclusively that three definite horizons in the oilfield were mineralogically entirely distinct. But unfortunately a brief examination in the field had proved the same thing fifty years before, and the detailed examination by modern methods did not bring the problems concerned any nearer solution. There is thus a distinct danger in discarding the methods of the old prospector, which still have their uses. L. D. S.

IN QUEST OF THE WESTERN OCEAN. By NELLIS M. CROUSE, PH.D. *London: J. M. Dent & Sons* 1928. 9×6 *inches;* xiv+480 *pages; maps.* 25*s*

It must be a surprise to many that no general history of geographical discovery in the fifteenth and sixteenth centuries has yet been produced in this country. The classical age of world-exploration calls for treatment in some standard work, but has not received it. A consideration of the subject suggests reasons for the deficiency. To cover the whole ground by original and independent research would occupy a lifetime; and when the material has been collected its interpretation will call for the highest expression of logical power, controlled imagination, and skill in exposition. Even then the result can hardly hope for acceptance as definitive, for it will certainly be challenged in many passages by alternative readings of the evidence, since three-fourths of the necessary data must be reconstructed by more or less plausible guesswork. Research therefore has produced only monographs—special studies of particular transactions; and these, whilst providing material for the popularizer, are sufficiently diverse in their conclusions to exercise his judgment to the utmost.

Dr. Crouse has undertaken to synthetize the knowledge attained in one large department of the subject: that which deals with the attempts of Europeans to find contact with Asia by a westward passage in latitudes north of the equator. He traces the story from the late fifteenth to the mid-eighteenth century, when hope of a commercially practicable passage was abandoned. The purely scientific exploration of more recent times is excluded from his scope, and so also is the earlier commercial exploration which did succeed in finding the South-West Passage by the Strait of Magellan and Cape Horn. He works mainly upon the results of monograph research in the earlier part of the period, although in the later he has had recourse to the chief original narratives which exist in printed form. His historical judgment is sound, and his survey of the material may perhaps be described as fairly adequate. It is far from superficial, but it is also not exhaustive.

The book opens with an introduction showing the motives of European attempts to gain contact with Eastern Asia. Then the story of the Quest begins with the English voyages promoted by the Cabots. Columbus is omitted. A full account of his work would, of course, be wide of the mark, but some discussion of his original doctrines and intentions would have been valuable to the general reader and seem necessary to a fulfilment of the title. After the Cabots come other early English voyages and those of the French under Cartier. Mr. Crouse is not quite up to date in his reading on these points. He has failed to notice the Sebastian Cabot document contributed by Professor Newton to the *English Historical Review* in 1922, or the important evidence on the 1517 voyage printed by Professor A. W. Reed in the *Mariner's Mirror* for May 1923. Nor does he make reference to Dr. H. P. Biggar's edition of the 'Voyages of Jacques Cartier' (1924), which with its large map-

reproductions and close annotation calls for study. After the middle of the century the Quest swung to the North-East with the English Muscovy Company, and then again to the North-West with Gilbert, Frobisher, and Davis. Condensation of the narrative leads to error in the statements that Chancellor "stopped in Norway, successfully wintered through the cold season, and the following year made his way to Archangel," and that Jenkinson reached "the Persian town of Bokhara." The explanation on p. 101 would also seem to imply that Gilbert was a believer in the Copernican system, which may be doubted. Chapter iii gives a good account of Hudson and his successors in Hudson Bay. Here, by the way, the reader should note that Luke Foxe's rival was not William James, but Thomas James. Chapter iv brings out the hopes and efforts of the Virginia colonists for a Pacific passage through the continent. This is valuable, for Virginia has usually been dealt with from the purely colonial point of view, and general histories commonly ignore the geographical motive of its founders. The latter part of the book is chiefly devoted to the exploration of the North American continent, largely by the French, and always with the idea of a navigable route to the Pacific. It shows how the hope of a salt-water channel slowly (and later than might be supposed) gave way to one of a route to be followed by using two rivers flowing east and west respectively from a central watershed. The discovery of the Mississippi and the Missouri kept this project alive into the eighteenth century. Mr. Crouse's analysis brings out a conclusion of more general application—the cartographical confusion and hindrance to progress caused by listening to the tales of savages. On almost every big problem the French trusted to Indian information, and on almost every one it was false and tempted them to waste of effort.

The book as a whole is a good rapid survey of a wide and deep subject. It should be useful for reference, and as a narrative is worthy of a place in public and college libraries, for the subject of early discovery is one in which general interest is increasing. J. A. W.

CHRISTOPHER COLUMBUS. By MARIUS ANDRÉ. Translated from the French by ELOISE PARKHURST-HUGUENIN. *London: Alfred A. Knopf* 1928. 9×6 *inches;* 286 *pages; illustrations.* 21*s*

It is somewhat unfortunate that on the wrapper of this English, as in the preface to the German, translation of M. Marius André's 'La Véridique Aventure de Christophe Colomb,' a claim is made which the author himself does not put forward and which certainly cannot be substantiated. "This study," it is said, "refutes the accepted generalizations . . . it is an acute psychological study from the pages of which emerges . . . the authentic character of the discoverer—ignorant, dishonest, unscrupulous, a complete ignoramus in matters nautical. . . ." The suggestion here made is obviously that the book is to be regarded as a serious contribution to historical knowledge, a suggestion which M. André himself would perhaps be the first to repudiate. The French collection in which the volume appears is styled 'Le roman des grandes existences,' and the other titles in the series suffice to indicate their character: 'La prodigieuse vie . . .'; 'La vie aventureuse . . .'; 'La vie paresseuse . . .'; 'La vie douloureuse . . .' This particular volume may fairly be compared with the 'Vie et voyage de Christophe Colomb' of Roselly de Lorgues: here is a second half-disguised historical novel —with the difference that whereas Rossely de Lorgues painted Columbus as a saint surrounded by knaves, M. André depicts him as a knave surrounded by saints.

The book is fascinating when it is realized that it is not to be regarded as

history or as biography. The purely imaginary conversations are lively enough, and it is possible that in some cases they represent the essential sentiments of the characters. It is rather to be regretted that M. André did not frankly write an historical novel, instead of a novel which might be mistaken, as it seems to have been mistaken in Germany, for a serious work. The historical form which the book, in places, assumes makes it unfortunate that there should be in it a number of blunders. The materials used are frequently misread. Oviedo never mentions Antonio de Marchena (p. 54): the 'Opus Epistolarum' of Peter Martyr is confused with his Decades (p. 112); Diego Carillo was not actually "sent" to Hispaniola, although it had been proposed to send him (p. 225); Caonabo was not made a slave (p. 229); Columbus did not "battle" with Roldán "for two years" from August 1498, nor had his agreement with the rebels "just been consummated" when Bobadilla reached Santo Domingo (p. 252). Much is made of the supposed fact that Columbus described himself as "the Ambassador of God": the basis for this assertion is nothing more than a doubtful translation of a passage in the letter to the sovereigns describing the third voyage. There is no evidence for the suggestion made that Luis de Santangel wished to enslave the Indians (pp. 78, 192); Galicia did not support La Beltraneja (p. 37); the discovery of the Cape of Good Hope was not known in Spain in 1487 (p. 70); Ferdinand Columbus does not claim that his father returned to Hispaniola from the "conquest," but from the "*scoprimento*," of Cuba (p. 32); there is no evidence that Columbus himself ever boasted of that distinguished ancestry which is ascribed to him by his son and by Las Casas (p. 14). Columbus never sought or received the title of "Admiral of Castille," which was then an hereditary honour in the Enriquez family, nor did that title imply any knowledge of navigation (p. 95). Even in an historical novel, it is hardly pardonable to call the Cardinal of Spain "Guzman" de Mendoza (p. 65) or to make Castillians talk of Ferdinand and Isabella as "their Catholic Majesties" in 1486 (p. 59).

The translation is, on the whole,well done, although "évêque" does not mean "archdeacon" (p. 238), and a desire for dramatic force does not justify the rendering given of "personne ne s'intéressait plus à Christophe Colomb; son nom était tombé dans l'oubli" (p. 285). In places there is some carelessness; there is no justification for calling in an English book "la Santa Hermandad" either "la Sainte-Hermandad" (p. 78) or "Saint-Hermandad" (p. 33); for naming a Spanish king "Alphonse" (p. 55) or for writing "the island of Jean-Mayen" (p. 41) or "Marin de Tyr" (p. 63). The illustrations, taken from the German translation, are excellent. C. J.

INTERPRETATIONS. By E. R. JOHNSON. *London: D. Appleton & Co.* 1928. 8×5 *inches;* 224 *pages.* 6*s*

Professor Johnson's interpretations deal with China and London. The book is divided between these topics except for a few impressions of Wales that treat mainly of St. David's Cathedral. He is a keen observer and writer of distinction. His Chinese travels impressed him most with the low standard of life in China owing to the heavy over-population. In spite of high infant mortality, disease, and occasional famine, the population has grown far too quickly. Unless the reckless propagation of the race ceases Professor Johnson sees no likelihood of a change in social ideas. He does not believe that China of to-day will be seriously modified by Government agency, or that the ills of China can be mended by the introduction, even were it allowed, of foreign capital. But he believes that individual and social ideals will change slowly as education spreads. It is by education alone that the Chinese will learn that their standard of living can be raised by checking the birth-rate, and that they

will be able to command more enlightened government with an eye on the future rather than an adherence to the past. This is admittedly a slow remedy and one that cannot be hastened. Revolution and uprising are the symptoms of unrest and dissatisfaction with the old order: sovietism and socialism are useless panaceas that only lengthen the road to success. The three essays on London, its lure, its greatness, and its future, are less important. Professor Johnson believes that London will continue to grow in the front rank of commercial cities, "second to only one other city as to the value of her foreign trade and as to the scope of her financial power." R. N. R. B.

AN ANNOTATED MAP BOOK OF THE BRITISH EMPIRE. By K. le CHEMINANT. *London: G. Routledge & Sons* 1928. 10×6 *inches;* xii+72 *pages; sketch-maps and diagrams.* 3*s* 6*d*

In encouraging map drawing and the use of maps in the study of geography this book has a laudable aim. The thirty or more outline maps of different parts of the Empire, with various distributions roughly indicated, are good of their kind and should be a help to students. An obvious criticism of the book however is that it encourages mere memorizing and cram. The notes accompanying each map are very brief, little more than the record of isolated facts, and they stress chiefly the economic value of the region in European trade Geography must have a wider outlook if it is to be educational. Facts of location, production, and trade have their importance, but by themselves are barren and dull. Some of the notes, moreover, would bear correction. The restriction of the Archæan plateau to a few areas in Eastern Canada, with the remainder left unidentified, is misleading. In India the north-east monsoon winds are described as "cold Arctic winds which reach the plain *via* the Ganges and Brahmaputra valleys," and in East Africa the few harbours are attributed to "little or no continental shelf." But if books must be written to serve examinations as an end in themselves this book may be of use, until examinations are amended. R. N. R. B.

A TREATISE ON THE ONE-HUMPED CAMEL: in health and in disease. By A. S. LEESE. *Stamford, Lincs.: Haynes & Son* 1927. 9×6 *inches;* 382 *pages, and* 20 *plates.* 16*s*

This work is possibly more exhaustive and complete, from the purely veterinary point of view, than the ordinary traveller requires. Should one contemplate a long journey with camel transport (outside the area of the Bactrian or two-humped camel) a preliminary study of Captain Leese's book could not fail to be of value. It is to be regretted that a handbook like this was not available many years ago when the traveller and the soldier alike were often dependent upon camel transport. The author has collected a mass of valuable facts, which he records clearly and succinctly in the first seventeen chapters, which are of a general nature. Intending camel travellers would be well advised to make copious extracts from this section. L. V. S. B.

THE MONTHLY RECORD

THAMES TIDAL FLOODS

We have received the 'Report of a Committee appointed at a Conference of Public Authorities to consider the Question of Floods from the River Thames in the County of London' (H.M. Stationery Office, 1928. Price 6*d net*). A conference on 16 January 1928 was summoned at the instance of the Prime Minister to review the situation and settle what action should be taken to obviate any recurrence of such loss of life and widespread damage as resulted in London from the high tide and storm of January 6. It was decided that a Committee representative of various Government Departments concerned, including the Hydrographic Department, Meteorological Office, Thames Conservancy, Port of London Authority, London County Council, and various Metropolitan Borough Councils, should be appointed to examine in detail the matters discussed at the meeting, particularly the broad causes of the disaster, the question of the probability of the recurrence of such an abnormally high tide, and the giving of warnings. An important finding of the Committee is that from the records of past tides there was no reason to expect a tide of the magnitude of that of January 6–7, and that there was every reason to consider the existing defences amply sufficient. The tide of 6 January 1928, 18 feet 5 inches above O.D., exceeded by as much as 11 inches the previous highest, that of 18 January 1881, which itself had held the "record" up till that time, and likewise caused flooding in London. There seems, indeed, to have been a progressive increase in the heights of exceptional tides in London during several centuries, culminating in 1928, though it must be remembered that the records are not always strictly comparable. As there is no reason to suppose that the climate has become progressively stormier, the reason must probably be sought in the changed regimen of the river in the direction of dredging and embanking.

As to the causes of the flood of 1928 the conclusion is that which indeed was generally apparent at the time of the disaster—the combination of a spring tide, a severe north-westerly gale in the North Sea raising the water in the estuary, and the charging of the upper Thames with quantities of snow-water. The latter may, indeed, have been the critical factor, but to what extent it operated cannot yet be determined. It is noteworthy that in 1881 the flood synchronized with a severe easterly gale, a memorable snowstorm, but a hard frost, so that the land factor did not come in. The committee finds that the whole subject of Thames Estuary floods is in need of special investigation, and recommends that the Liverpool Tidal Institute, which has considerable experience of similar problems, should be consulted as to a joint investigation with the Meteorological Office and the Hydrographic Department of the Admiralty. Meanwhile, until the investigation is completed it is recommended that the Meteorological Office should issue special warnings when gales in the North Sea are expected about the time of spring tides, and that a watch should be kept on the Southend tide-gauge for the purpose of issuing supplementary warnings.

The disaster whereby fourteen persons were drowned on 6 January 1928 no doubt assumed special prominence in the public mind because it happened to occur in London. It should be remembered that in the thunderstorm on the Lincolnshire Wolds on 29 May 1920 as many as twenty-two people were drowned in the little town of Louth (see *Journal*, 58, 390).

HAMBURG AND THE BALTIC TRADE

In thanking us for the review of his work on the Baltic ports printed in our May number (p. 484), Baron de Geer remarks that on one point the reviewer has misunderstood his point of view, when he says that the Baron reckons

Hamburg a Baltic Port. In fact the book expressly stated (p. 19) that "Hamburg is primarily a North Sea and Ocean port of the German railway system." But as a minor yet important part of its traffic goes to and from the Baltic through the Kiel Canal, it was thought necessary to treat it, and the ports of Copenhagen and Göteborg, as a group of entrance harbours to the Baltic. It also seemed desirable to show (*e.g.* on the diagram on pp. 48–49) the total trade of all the ports dealt with, so as to give a comparative idea of their importance, and therefore the non-Baltic trade of these entrance harbours was included. Similarly the *whole* trade of the interior ports was given, and no attempt was made to separate out the more strictly Baltic traffic.

IRON ORE IN SOUTH AFRICA

A valuable summary of the iron resources of the Union of South Africa by Dr. P. A. Wagner has recently been issued as Memoir No. 26 of the South African Geological Survey. This gives a short sketch of the iron industry, and discusses the occurrence, geology, and economic value of each deposit in turn; the basis of the classification being genetic—igneous, sedimentary, replacement deposits and secondary concentrations, and superficial deposits. The work is therefore of value to the scientist and to the industrialist. Despite the existence of large quantities of iron ores, the iron industry in South Africa dates practically from the first decade of this century, and has yet to be developed on a large scale. During the war it received a considerable stimulus, but the subsequent fall in prices was too great for its survival. The present position is: a blast furnace at Newcastle, Natal, producing 150 tons a day; experimental plant at Pretoria; and a steel works with an annual capacity of 30,000 tons at Vereeniging. A continental commission recently reported that the best site for the industry was Pretoria, and that it should be economically successful. Of the ores of igneous origin there are immense deposits of titaniferous iron ores associated with the Bushveld igneous complex, but these ores, though they have some valuable properties, are at present avoided by iron smelters. Lode and vein deposits are relatively unimportant. The most important deposits at the present stage of development are the replacement deposits and secondary deposits of the Lake Superior type. These are formed by the leaching out and deposition of silica from secondary hematite in banded ferrugineous cherts, occurring in the Transvaal and Griqualand West. The Transvaal deposits lie near the Crocodile River in the N. Rustenburg district. They are at present rather inaccessible, but there are no serious obstacles to cheap mining—underground mining being unnecessary. The Griqualand deposits occur in the Blink Klip breccia near Postmasburg. Omitting from the calculation all titaniferous deposits, and taking a conservative view of their extent, Dr. Wagner estimates that the probable reserve of actual ore in South Africa is only exceeded by those of India, the United States, Brazil and France. This, combined with the occurrence of the ore generally in proximity to coking coal, manganese and other deposits, should assure the eventual prosperity of the industry.

DEVELOPMENT OF THE CANADIAN PRAIRIE PROVINCES

The considerable variety of conditions to be added to the usual generalized description of the Canadian Prairie provinces, and its influence upon their economic development, are detailed by Prof. Rodwell Jones in a paper published in *Geography* (Spring, 1928). The surface of the great Cretaceous plateau rising to the south-west and broken by two scarps, the Lake Winnipeg scarp and the continuation of the Missouri coteau, is also diversified by an intermediate belt of high ground (Touchwood, Beaver and Moose Mount plateaux) and by many isolated blocks capped with Tertiary gravels. West of the Pre-Cambrian shield,

the first "step," extending across the Red River valley to the next break, marked by the Pembina–Porcupine Mountains, is not, save in the south, a thickly settled area of true prairie. The increase of precipitation north and east of Winnipeg causes a southerly extension of the "grove" and "heavy bush" belts which intrude into the coniferous forest belt. While land is being cleared for settlement much farther to the west, clearing has not progressed extensively in this area: the soil is generally less fertile than that of the prairie proper, the timber is small and not valuable, the drainage is undeveloped post-glacial, and the growing season is shorter. The easiest line of communication with the outside world in the early settlement days was the Red River valley—which led to United States territory. The Canadian Pacific arrived only just in time to prevent American railway and lake steamer organizations from binding the North-West firmly to the States.

Along the southern border of the prairie provinces lie a series of tertiary gravel-topped plateaux—Wood, Cypress and Milk River Hills. Railways, the dominant factor in prairie development, have avoided them, because of their rougher topography, which, combined with poor soils, has also prevented close settlement. They offer, however, fair opportunities for ranching. The western boundary of the prairies beyond Lethbridge–Calgary is physiographical, the topography changing rapidly, almost without the intervening foothill stage, to the Rocky Mountain type; at the northern end, where the Rockies swing to the north-west, its boundary is the forest belt. Thus the main area of development is within the great triangle of mixed "grove" and prairie which has Edmonton, Winnipeg and Cardston as its apexes. Here large-scale farming and railway systems are densest, but within it again are considerable areas of unsettled plateau country. In the south-west a further and more important control operates: the rainfall decreases to less than 13 inches annually south of Medicine Hat. This was originally ranch country: later farmers took up land, and some of the best wheats in Canada have been grown here. Recent dry seasons have led to abandonment of farms; apart from large irrigation developments, it would be better for ranches, with winter fodder supplied from smaller irrigated areas.

The irrigated district of the prairie provinces is at present that between the Old Man and Bow Rivers. Wheat is still the chief crop, and the farmers use the water only during dry cycles of years. But 20 per cent. of the possible area is under irrigation: the greater cost of the land, the necessity for employing more labour, and the problem of finding markets for products other than wheat are among the discouraging factors. The striking predominance of wheat in the prairie economy is to be ascribed to a conjunction of factors: climate, topography, and soil are exceptionally suitable, and development took place just when the English market was expanding and export from the United States was falling off. The dependence upon a single product has its drawbacks in diminishing fertility, spread of weeds and diseases, soil drifting, etc. At present mixed farming has developed in three regions: in the moister and heavily populated area around Winnipeg, in the "grove" lands where the climate is more suitable, and in the western irrigated areas. Recent advances in transportation are the building of the Hudson Bay Railway towards Churchill, and the growth of Vancouver to be the third grain port of the continent.

VARIABILITY OF RAINFALL

Attention may be drawn to Ergänzungsheft Nr. 195 (1927) of *Petermanns Mitteilungen* (" Die Verteilung der Extremen Regenschwankungen über die Erde "), which contains a coloured map of the world showing the variability of rainfall expressed as a simple quotient of the maximum annual rainfall by

the minimum annual rainfall in as long a record as exists for a large number of stations. The author, Dr. Otto Eberle, gives in tabular form the full statistics for each of the stations involved in the construction of the map, as well as a short explanatory text. The regions on the map coloured blue denote a small variability on the above basis with a quotient of less than 2; those with a quotient between 2 and 4 are coloured green; between 4 and 5 orange; and over 5 yellow. The blue region, comprising all the wet regions of the equatorial belt together with North-Western Europe and a few other moist regions, has a variability of little significance for vegetation, and is the most favoured in the world as regards adequate supplies of moisture. The green region, comprising Russia, India, Paraguay among other countries, has a variability which is on the whole innocuous, but in cases where the annual amount of rain is small the irregularity in it has more serious effects when the rain is spread over the whole year than when concentrated into a wet season. The orange region, including much of Siberia and the Middle West of North America, has a pernicious régime, rendering irrigation a necessity, whilst the yellow region comprising all the desert areas of the globe is, needless to say, absolutely destructive. This yellow region of great irregularity also includes the Arctic tundra belt and most of Greenland, since in these cold regions the mean annual rainfall somewhere about 10 inches is so low that a variation of a few inches on either side gives high quotients. In any case the region is pernicious to vegetation by reason of cold, and the permanently frozen subsoil induces a condition of physiological drought.

Roughly speaking, the variability is small in moist oceanic climates and high in dry continental ones, especially in those where the seasonal variation is pronounced. In some of the Pacific tropical islands, however, the irregularity of the rainfall from one year to another is great; apparently because they lie in a rather uncertain position with respect to the Trades and Doldrums.

Like other statistical coloured maps this one will no doubt be instructive in helping the student to find his bearings, but should not be trusted too slavishly. The worst of maps of this sort is that they parcel out the surface of the globe into hard and fast categories which do not exist in nature. In any case the information presented in such statistical documents has to be very carefully interpreted in the light of wider issues raised.

OLD MAPS AT THE BRITISH MUSEUM

On the occasion of the International Geographical Congress Mr. F. P. Sprent, in charge of the Map Department, arranged an exhibition of manuscript and printed maps in the King's Library of the British Museum. Among the maps exhibited were several of the unique or rare possessions of the Museum, which have frequently been described, such as the world map of 1506 drawn by Contarini (the first printed map to show any part of America) the manuscript map of Guiana drawn for Sir Walter Raleigh, and Hondius' world map showing Drake's route on his circumnavigation, with the accompanying "Corte Beschryvinghe" and portraits of Drake and Cavendish. In selecting and arranging the maps, Mr. Sprent has succeeded in combining comprehensiveness with variety, for all the continents and most countries are represented, and most types of maps. The opening section contains three maps of the British Isles—the first printed map from the Bologna edition of Ptolemy, the map by George Lily published at Rome in 1546, and Saxton's map of 1579—with several specimens of early county maps by Saxton, Norden, and Speed, also Lambarde's "Carde, of the Beacons, in Kent" (1596). Then, in addition to that already mentioned, are two other maps illustrating Drake's career, the early French

issue of the map of his circumnavigation, probably published in Amsterdam about 1581, and the map from "Summarie and true Discourse of Sir Francis Drake's West Indian voyage," 1589.

Another section illustrates the early exploration of North America and the search for the North-West Passage with, among others, Michael Lok's map from Hakluyt's 'Discovery of America,' 1582, and Frobisher's map of supposed North-West passage of 1578. The road-book section comprises the map of Central Europe showing pilgrim routes across the Alps to Rome printed at Nuremberg in 1492, and entitled "Das ist der Rom Weg," one of the earliest printed maps to show any indication of routes, and several of Cary's publications from the end of the eighteenth century.

The manuscript maps are equally comprehensive: a particularly interesting item is three maps of Great Britain drawn by Matthew Paris of St. Albans in the middle of the thirteenth century. These show a fairly correct general topographical knowledge, the two outstanding lapses being the significant distortion which makes the Thames a south-coast tributary and the severance of Scotland from England but for a bridge at Stirling. There is also an indication on one of what is assumed to be a high-road from London and St. Albans to Durham. Two small ecclesiastical world maps are also shown, with the characteristic circular form, Jerusalem at the centre, and the east at the top, very similar to the early woodcut map from 'Rudimentum Noviciorum,' Lubeck, 1475, and a fifteenth-century Greek manuscript of Ptolemy. The portolans exhibited comprise elaborately decorated specimens of the work of Battista Agnese, Fernão Vaz Dourado and Diego Homem, and a portion of the east coast of S. America by John Rotz, or Jehan Roze, of Dieppe, 1542. The last section, city views and plans, contains perhaps some of the less well-known items of the exhibition—Cunningham's Norwich, 1559; Lyne's Cambridge, 1574; Hooker's Exeter, 1587; Norden's Westminster, 1593; Hollar's Oxford, 1643; and Millerd's Bristol, 1671. There are also representations of Jerusalem (from Bernhard von Breydenbach's "Peregrinationes," Mainz, 1486), New York, and London, the last including works by Agas, Hollar and Rocque. This exhibition—the above list is by no means exhaustive—offers an opportunity of becoming familiarized with the main developments of historical cartography; it is somewhat strange to find, therefore, that it contains no specimen of the work of Mercator.

GEOGRAPHERS AND CLIMATIC DATA

In the current summer *Geography* (as the organ of the Geographical Association is now styled) Dr. M. I. Newbigin, while realizing the great importance of the study of climate in geography, criticizes the way in which geographers are apt to misinterpret, or misapply, meteorological statistics and theories. Her main contention seems certainly justified. She rightly insists that statistics only tell part of the story, and that, unless interpreted in the light of organic responses, may be positively misleading. Statements of mean annual rainfall, for instance, are often worthless unless coupled with information about the frequency and seasonal distribution of the rain or even the thermal conditions of the climate in question. Again, Dr. Newbigin records her surprise, during a summer visit to Winnipeg, which has a mean winter temperature of $-3°$ F. (expressive of $35°$ of frost), to find that hardy annuals familiar in English gardens were left out all the winter because a considerable proportion could survive several winters. This would hardly be possible if the winter temperature, as is commonly inferred, were constantly near $-3°$, a figure which simply expresses the incidence of a few very intense cold waves. Coming to our own islands, the relative mildness of our winters on the basis of isotherms reduced to sea-level is often overstressed;

the limitation in the number of plant species and associations by cool, damp summers in comparison with Central Europe is an effect of the oceanic climate that is frequently overlooked, as is also the fact that in consequence of deficient summer heat, of tempestuous winds, and of late lingering snows, the Scottish mountain flora is of an Arctic type at levels which in the Alps are highly productive. Is the town child, say in London, asks Dr. Newbigin, sheltered as he is from stress of weather by all the amenities of a great lowland city, made to understand that over a very large part of Scotland, much of Wales, and parts of Northern England, communications are seriously interfered with by snow for considerable periods every winter? We might add a further example of doubtful generalizations found in otherwise good text-books. We are often told that in the south-west of Ireland snow is almost unknown, whereas many records exist of considerable or heavy falls in that region within the past fifty years, notably the great blizzard of 1917. In fact, nowhere north of 45° could the statement be taken as literally true.

CORRESPONDENCE

PHOTOGRAPHS OF BIG GAME

I HAVE just seen the review, in the June number of the Society's *Journal*, of my book 'Big Game Shooting in the Indian Empire.' In this it is stated that the book contains photographs of wounded animals. I emphatically deny that this is the case, and much resent the statement. Such photographs are repugnant, as they prolong the pain of animals. I can conclude only that the reviewer has not read the book carefully or noticed the advice given on p. 85 that "animals should be carefully posed."

In the *Journal* of the Bombay Natural History Society, of which the reviewer was then and still is a member, I wrote an article, fairly recently, on the "Photography and Measurements of Big Game." I presume the reviewer did not read it. In it I explained how such posing can be carried out with the aid of a bifurcate prop: the short arm going under the jawbone, and the long arm under the base of the ear or horn.

The photographs of oorial (frontispiece), Nilgiri tahr, Himalayan tahr, burhel, and the lower of the three Shapoo rams (facing p. 120) were obtained by this method. Is it possible that the reviewer has been deceived into thinking the animals are alive? The posing is done with a view to obtaining a photograph which will help a museum worker in mounting a specimen (so deplorably badly done in even some of the greatest collections). If the reviewer has been misled as I suggest, then the posing has been successful.

In any case I must request him to acknowledge the incorrectness of a statement so damaging to myself and the readability of my book.

C. H. STOCKLEY, Lieut.-Col.

Junior United Service Club, London, S.W.1.
4 July 1928.

Major Hingston is in Greenland and it has not been possible to refer this question to him. But we are sure that he would wish us to express his regret that by the phrase "wounded or recently killed" he should have done injustice to Colonel Stockley, who draws the strongest distinction between the one and the other, and has expressed this emphatically in writing elsewhere, while feeling it was implied in the fact that a whole chapter dealt with posing the subject.

ED. *G.J.*

Anniversary General Meeting, 18 June 1928. The President, Colonel Sir Charles Close, in the Chair.

The minutes of the General Meeting held on 20 June 1927 were taken as read, and confirmed.

In presenting the Medals and Awards the PRESIDENT said: I should first point out that the two Gold Medals, the Patron's and the Founder's Medals, are of equal dignity and distinction. It has been the custom for many years past to award those medals for excellence, I might almost say super-excellence, in exploration. In early days the medals were awarded also for scientific research apart from exploration, but we have now the Victoria Research Medal which fills that particular gap, so that, in general, the Gold Medals are awarded for great excellence in exploration. This year His Majesty the King has approved the award of the Founder's Medal to Dr. Longstaff for his discovery of the Siachen Glacier and his long-continued geographical work in the Himalaya. A recent admirable paper on Nanda Devi by our medallist shows how long his work has been continued. He was at it last year in Garwhal. He is a veteran of Himalayan exploration, for the paper which he read to us last January recalled the fact that he first visited Garwhal in 1907. The terms of the award lay stress on his discovery of the great Karakoram glacier, the Siachen—a discovery which corrected our ideas on the main watershed between India and Central Asia. Records are not the interest of this Society: but since he is also a member of the Alpine Club we may as well first mention the fact that he reached the summit of Trisul twenty-one years ago, and that record stands as the highest summit yet reached by a man who has returned to tell the tale. And while we stray for a moment from geography, let us recall his service with the Gilgit Scouts during the Great War. He was Surgeon-Naturalist to the second Mount Everest Expedition in 1922, some years after he had plotted with General Bruce an assault upon the mountain. In the intervals between Himalayan travel he has been on Oxford expeditions to Spitsbergen; and the reason he is not here to-day is that "rather than hang about indoors doing nothing" he has gone off to Western Greenland with Major Hingston and a party of young Oxford men. Mrs. Longstaff has done us the honour of coming to represent the absent explorer this afternoon, and I understand that she has received a wire from Dr. Longstaff saying that he has reached Greenland and is commencing his work there. I ask her to receive the Founder's Medal for him and hand it to him on his return with the congratulations we should have tendered him had he been present.

The Patron's Medal is awarded this year, with His Majesty's permission, to Sir Hubert Wilkins.

Sir Hubert was, as we all know now, born in Australia. He was second in command to Stefansson in the second part of his Arctic expedition of 1913–17, and he thoroughly mastered Stefansson's methods. In 1917–19 he served in the Great War as a member of the Australian Air Force, becoming a captain and being awarded the Military Cross. He was naturalist, photographer, and second air officer on Shackleton's last expedition of 1921–22. He has been in charge of a natural history collecting expedition for the British Museum. In 1926 he took charge of the Detroit Arctic Expedition and went through many adventures, landing on the pack-ice north of Bering Strait in 1927, and getting off it again. The special reason why the Council have recommended the award to Sir Hubert Wilkins of the Patron's Medal is the fact that he has for many years continued his exploratory work in Arctic regions, culminating in the great flight which he

took with Lieutenant Eielson this year. I have the greatest pleasure, Sir Hubert, in handing to you the Patron's Medal.

Sir HUBERT WILKINS: It is indeed a great honour that you have conferred upon me to-day, and I accept this Medal with the knowledge that throughout my work in the Polar regions I have had the good fortune to receive assistance from many friends in Australia, in England, and in America. Without the aid of those friends it would have been impossible for me to have carried on my work. In particular, without the aid of my friends in America I could not have carried on until 1928 and have completed the programme that we set for ourselves in the Arctic by flying from Alaska to Spitsbergen. While it has been my great honour in the past to have had the privilege of being associated with my American friends and to have been given the American flag to carry as leader of an American expedition, I have not forgotten my own parentage and the country of my birth. I think the Americans paid me a great tribute not only in asking me to help them in carrying out work of interest to them and to the rest of the world, but in giving me permission to carry on that expedition, together with the United States flag, the British and the Australian flags. When I first accepted the leadership of that expedition there was some question in the daily press, and it exercised the minds of some of our explorers, as to what we would do if we found new lands in the Arctic. It was never our concern as to whether those lands should be claimed by Canada or America or any other country. We were geographers setting out to ascertain what was to be found in those unexplored regions. It was for others more versed in those matters to decide what country owned the land we might find. The privilege of carrying out the work was sufficient for us. Whose flag would fly in the future over that area did not concern us particularly, because our job was in the field. But I was very glad to have obtained permission of those supporters in America to carry with me not only the Australian flag, the flag of the country in which I was born, but also the British flag, through 18,000 miles of flying within the Arctic Circle.

When I received notice that His Majesty the King, at the recommendation of the Council of the Royal Geographical Society, would honour me by awarding me the Patron's Medal, I asked if I might receive an even greater honour, or one just as great, and that was that the Council of the Royal Geographical Society would accept for their Museum the British flag that I have carried throughout my Arctic endeavours. To-day I propose to separate these three flags that I have carried. I can assure you there were times in the Arctic when we needed the strength and the courage that only the sight of the flag of our own country brought us. There were many times during that strenuous effort in travelling over the ice when we used those flags sometimes to protect us from the ice, sometimes to protect us from the cold. We received great encouragement, and with the knowledge of the work that had been already done by famous British explorers, we were compelled to carry on, keep a stiff front and complete our work. You can imagine my feelings to-day when I hand over to your President the small British flag that I carried with me throughout three years' endeavour in the Arctic. I cherish it, and I hope when I return the flag that it has been my privilege to carry for the United States my supporters there will also realize what a privilege and what an honour has been done me to-day by the Royal Geographical Society awarding me the Patron's Medal and by accepting the British flag to place in the museum at the Society's house.

I expect shortly to carry out further work in Polar regions, *i.e.* in the Antarctic. While it now seems likely that expedition also will be an American one, I feel certain that my supporters in America will again give me the privilege of carrying another British flag. I thank you very much indeed for this honour,

which I am pleased to accept because it is a tribute not only to my efforts but to the efforts of the makers of the machine that enabled me to do the work and, particularly, to the skill and courage of my pilot, Lieutenant Carl Eielson, without whose help it would have been impossible for me to have carried on.

The PRESIDENT, in accepting the flag on behalf of the Society, said: We are, Sir Hubert, very grateful to you for having presented to the Society this flag which has such memorable associations. We shall put it in the Society's Museum and cherish it, for it will always be a memorial of your remarkable flight.

The Victoria Medal, given for scientific investigations and other similar matters, has this year been awarded by the Council to our old friend Mr. E. A. Reeves. Mr. Reeves joined the service of the Society fifty years ago, having accepted the office of assistant map curator in June 1878. Then Mr. John Coles left and Mr. Reeves became map curator, and in 1902 was promoted to the post of Instructor. He still holds both offices. During his term of office Mr. Reeves has invented several ingenious surveying instruments and shown great aptitude for making use of various new ideas. I mention particularly his adaptation of the prismatic astrolabe and his invention of the tangent micrometer. Then he practically re-wrote the last edition of Part I of 'Hints to Travellers,' a most valuable book. He was also almost entirely responsible for the survey part of that book. Mr. Reeves has been Instructor at the Society for twenty-six years, and during that period about 600 individuals have passed through his hands. I may say there is hardly a land or a sea on the surface of this globe which has not been explored by some of Mr. Reeves' pupils. Mr. Reeves has perfected his method of instruction so admirably that he was paid the high tribute of being copied by a very important society abroad. I might go on for a considerable time explaining how much Mr. Reeves has done for the Society, especially in connection with the instructional part of its work, but I am sure you will agree with me that never was the Victoria Research Medal better earned.

Mr. E. A. REEVES: I thank you most sincerely, Mr. President, for all the kind things you have said about me and for this Medal which you have presented to me on behalf of the Council. When I think of the eminent geographers who have received it before me, I feel very unworthy: still, the Council have been generous enough to award it to me, and I can assure you that it will ever be prized as a very great treasure.

It must always be very gratifying to receive awards from other societies, but then there is likely to be a feeling at the back of one's mind that if those who gave them knew more about one they would probably not have been so generous; however, in the present instance this cannot apply, and what makes this Medal so valuable to me is that it is given by my own Society, the Society with which I have been connected for fifty years, and with which, in a sense, I have grown up. It has been my privilege to serve the Society under many presidents and councils, and not only have they and the Fellows had opportunities of knowing of the few useful things I may have done, but they must be fully acquainted with my many weaknesses, shortcomings, and limitations as well; and in spite of all, this Medal has been given me to-day. I can assure you it is difficult for me to express my feelings of gratitude and how deeply I appreciate the great honour that has been done me. I will not detain you longer, Mr. President, but I do thank you and the Council most heartily for this award.

The PRESIDENT: The Murchison Grant is awarded to Captain C. J. Morris, of the 3rd Gurkhas, for his recent journey in Hunza—a journey planned and undertaken with Mr. H. F. Montagnier. Its details are fresh in our minds, for this account was published in the *Journal* only this month, illustrated by a small

selection of the excellent photographs that Captain Morris makes so well. His good work as transport officer and assistant photographer on the second Mount Everest Expedition is evident in the book of that expedition. He would have been on the third but for an accident that laid him up in hospital at the critical moment. Last year, with Mr. Montagnier in Hunza, he and Torabaz Khan filled in two large quite unsurveyed blanks in the Vissers' map. We are glad to hear from him that he proposes to devote this award to yet another expedition. He is on the Indian border now, and I will ask General Bruce to receive the award and certificate for him.

Brig.-Gen. The Hon. C. G. BRUCE: It is with the very greatest pleasure that I accept the award in order to hand it over to Captain Morris. I knew Captain Morris exceedingly well for one and a half years before I met him, because from Waziristan he used to write me letters every week on the subject of Gurkha and Nepal songs. The outcome of that correspondence was that he gave a lecture on this platform and, I think for the first and only time in the whole history of the Society, he had a piano and illustrated his lecture by some of those songs. Later he joined us on the Mount Everest Expedition. Besides that he has, I believe, penetrated with Major Brooke-Northey farther into Eastern and Western Nepal than anybody else. He even reached a farther point in Eastern Nepal, with his companion, than that reached by Sir Joseph Hooker in old days. His expedition to the Karakoram with Mr. Montagnier was remarkable in every way. He continued the work of the Vissers and illustrated his account by means of very remarkable photographs. He has experience and knowledge of languages, and not only does he know how to travel, but he has travelled in many different types of districts and dealt with many different types of people. Therefore his future as a traveller, in the Himalayas especially, should be assured. I shall send the award on to him with particular pleasure.

The PRESIDENT: The Back Grant is awarded to Mr. George Binney, of Merton College, for his journey across North-East Land and his successful conduct of Oxford Expeditions to Spitsbergen. The rigours and difficulties of North-East Land have been painfully brought to our notice in the last few weeks by the world-wide anxiety for the fate of General Nobile and his companions in the airship Italia. Mr. Binney was himself a pioneer of flying in those waters, and we recall how nearly he was lost. His excellent book shows in every chapter a talent for organization which is now devoted to the service of the Hudson's Bay Company. He is not here to-day because he has just sailed for his annual visit to Arctic Canada. He reminds us that the award is appropriate to his present employment, because Admiral Sir George Back was once Honorary Chief Factor of the H.B.C. Mr. Binney's father is present, and I will ask him to accept the award on behalf of his son.

Mr. BINNEY: I am deeply sensible of the distinction of receiving the Back Award from the Royal Geographical Society. It is a satisfaction to know that the work of the Oxford Expeditions has brought this honour to our University. The credit belongs more to my companions than to myself; for the course of our three ventures was shaped and safely achieved through their loyalty, zeal and good humour. Admiral Sir Richard Back, the founder of this grant, was an honorary Chief Factor of the Hudson's Bay Company in whose service I have the privilege to work—thus your generous award happily combines for me business with Arctic associations.

The PRESIDENT: The Cuthbert Peek Grant is awarded to Mr. H. G. Watkins in recognition of his leadership of the Cambridge Expedition to Edge Island, and to assist him in his proposed expedition to Labrador. The Edge Island story is fresh in our minds as a successful summer raid. In a few days he sails for a year's

work in inhospitable Labrador, where we wish him all good fortune, and a safe return to give us his results. He goes to study that watershed at the head of the Romaine River on a recently glaciated plateau, which is part of the boundary between Canada and Labrador—a watershed which in the Privy Council may be called a "height of land," but which has never been properly described and may be full of surprises.

Mr. H. G. WATKINS: It is very pleasant indeed to receive a grant such as this, but quite unpleasant and frightening to have to get up and thank you for it, especially to one of my age. When Mr. Reeves first told me of this Grant he said, "I am afraid when the Grant is given you will be away in Labrador." I said, "Yes, I am afraid I shall," and I immediately went away and looked up the boats to Newfoundland. I found, unfortunately, that there was no boat sailing, and so I had to come here. I will content myself by thanking you very much indeed for the great honour you have done me and the entire expedition in giving me this Grant for the Cambridge Expedition to Edge Island. There were, after all, nine members of the expedition, so that only one-ninth of the honour belongs to me. In connection with the expedition to Labrador I can only say I hope it will be as successful as it ought to be with the very great help you have given us. Thank you very much indeed.

The PRESIDENT: The Gill Memorial is awarded to Mr. C. P. Skrine for his exploration of the Qungur massif and his work on Chinese Central Asia. From the Consulate-General at Kashgar the Qungur may be seen on a few early mornings: but it had never been visited, still less described or photographed. Mr. Skrine's photographs themselves deserve an award. They make his paper on Qungur and his book on Chinese Central Asia remarkable for beauty of illustration: and one of his secrets is that he will never hesitate to climb a few thousand feet to get a view-point. The Society's collection is rich in pictures from his camera of Qungur, Tien Shan, and the road to Kashgar through Hunza. He is at a distant station in Seistan, and his father has kindly attended this afternoon to receive the award for him. We ask him to transmit it to him with best wishes for success in seizing future opportunities: and we are happy to know that he intends to spend the money on new photographic apparatus.

The PRESIDENT then delivered his Anniversary Address, which is printed on p. 97.

Visitors having withdrawn in order that the Society might complete the business of the meeting, the President appointed Messrs. Owen and Hyatt to act as Scrutineers of the Ballot for the President and Council for the ensuing year.

The Annual Report having been unanimously adopted, without discussion, the President announced that the Scrutineers had reported that the names proposed by the Council had been accepted by the Meeting (see List, p. xiii).

Sir CECIL PEREIRA: I have much pleasure in asking you to pass a vote of thanks to the retiring members of the Council, and I would like especially to mention Mr. Maudslay, who is retiring from the position of Honorary Secretary, which he has held for so many years. We are glad to think that his connection with the Society is not ending, for he becomes one of our Vice-Presidents.

The vote of thanks having been carried by acclamation, the PRESIDENT added: Before I close the meeting I should like to read a telegram received from the President of the Lisbon Geographical Society: "Send compliments Anniversary Meeting under your President." We shall return a suitable reply.

THE ANNIVERSARY DINNER

The Anniversary Dinner of the Society was held at the Connaught Rooms on Monday 18 June 1928.

The President and Lady Close received the company, which included, as guests of the Society, H.E. the Italian Ambassador, the Secretary of State for the Dominions and Mrs. Amery, Jafar Pasha el Askeri, the High Commissioner for Africa and Mrs. Smit, the Astronomer Royal and Lady Dyson, Admiral of the Fleet Sir Charles and Lady Madden, Major-General Charles, Air Vice-Marshal Sir Philip and Lady Game, Sir Hubert Wilkins, the President of the Manchester Geographical Society, the President of the Institution of Civil Engineers, Captain and Mrs. Feakes (Royal Australian Navy), Mrs. T. G. Longstaff, Mr. H. P. and Miss Moore (South Australian Geographical Society), Mr. E. A. Reeves, Lieutenant Carl Eielson, and Dr. Erik Nilsson.

After the loyal toasts had been honoured, Mr. AMERY, proposing the toast of "The Society," said: In rising to propose the toast of this distinguished Society and seeing before me many of those of my friends who have contributed so much to the cause of exploration and of geographical knowledge, I feel a certain wistful sense of youthful dreams left unfulfilled. How ardently I once hoped it might be my lot to be an explorer! Indeed, I began fairly well. My first exploration was when I accompanied my parents up the then almost unknown valley of the Upper Ganges to a height of some 10,000 feet. That was in 1876. I was then not quite three years old! All too soon the shades of the prison house closed on me in the shape of school, college, and office work and, last but not least, the House of Commons. I have, it is true, travelled a certain amount round the world for study and on business, but it has only been at rare intervals that a longer break has given me the opportunity, in Africa or in the Rockies or in Hudson Bay, to savour a little of the joys of getting really off the beaten track. I have during the last few months made a peregrination of something like 50,000 miles of our great Dominions. That was a very wonderful, an inspiring, and stimulating experience, but it was in the nature of political rather than of geographical exploration. However, all great British explorers—such as Sir Walter Raleigh and, greatest of all, Captain Cook—always felt that they were contributing not only to the acquisition of geographical knowledge but also to the building up of new British worlds in future years, and were in a sense political explorers.

In any case, not only for myself but for all of us, sad as it may seem, the age of exploration is passing away. The unknown portions of the world's surface are year by year dwindling away. Only a few weeks ago Sir Hubert Wilkins in the course of one spring day cleared up more of the unknown Arctic world than had been previously accomplished by many years of exploration. For 1400 miles out of a flight of 2200 he and his companion cut a swathe of new knowledge some 200 miles wide across the Arctic world. Important as their flight may have been from the point of view of its actual contribution to geographical knowledge, it has perhaps even more importance from another aspect, namely, that of its effect upon our conception of the Earth we live upon. That the Earth is a sphere was suggested by the early Greek philosophers, and proved, from the scientific point of view, by Aristotle more than two thousand years ago. But it was not until the ocean-going ship and the compass enabled Vasco da Gama and Columbus and Magellan to get round the world that theory was translated into a practical working fact. Even then there were many practical obstacles—impassable mountains, deserts, vast continents—which still stood in the way of anything but a very imperfect grasp of the idea. Those obstacles human endeavour has progressively swept away. The Suez Canal and the trans-Siberian Railway in the Old World, the Canadian Pacific Railway and the Panama Canal

in the New, are only among the most striking instances of a process which, in the course of the more recent past, has strengthened our effective realization of the shape of the Earth. To-day we stand on the eve of a new era. The airship and the aeroplane, which know no obstacles on land or sea, will tend to give to all world communications a more and more purely spatial and directional character, if I may say so, over the surface of the globe. Modified only by the prevalent winds, the Great Circle routes will link up distant centres upon the Earth regardless of the surface configuration between them.

There is one aspect of that change where realization has been peculiarly slow. There are two portions of the Earth's surface which have hitherto presented an insuperable obstacle, if not to actual exploration, at any rate to the effective development of ordinary locomotion—I mean the Arctic and Antarctic regions—and have never yet in any true sense come within our conception of the world as a sphere. Moreover, our habit of using maps based on Mercator's projection has, to a large extent, prevented our realizing the world as being a sphere in more than one direction. We unconsciously tried to think of it as a cylinder with two ends which can be disregarded for all purposes of communication. Well, that is all being changed. Even if the Antarctic is likely to remain, for most practical purposes, out of our picture, I am sure we look forward to very valuable results, from the point of view of meteorology, from the explorations that Sir Hubert Wilkins and Commander Byrd hope to conduct in the next few months. But intrepid explorers like himself and his comrade Eielson, like Amundsen and Nobile, are giving us wholly new ideas of the place of the Arctic on our globe. So far from being an unknown end of the world, we are beginning to realize that the Arctic Ocean is something in the nature of a Piccadilly Circus that has been "up" so far, and is soon going to be open for traffic in every direction. It used to be said that all roads led to Rome. I am not sure that in the future it will not be said that most of the main long-distance highways of the civilized world will lead through, or very near, the North Pole. It is difficult to realize, till we adjust our ideas, that the shortest way from England to Japan is by way of Spitsbergen, the Arctic Ocean, and Siberia, and the shortest way from London to Vancouver is by way of Greenland and Hudson Bay.

These things, coupled with such wonders as the development of wireless, are bound to influence our whole conception of the world. Only recently I spoke from my room in the House of Commons to my Under-Secretary, Mr. Ormsby Gore, who was on the telephone somewhere in Java. Such facilities are bound to exercise a profound influence on the future economic and political development of the British Empire. That Empire, if we look at it geographically, consists of two main portions: a northern or Atlantic half comprising the British Isles, Canada, West Africa and the West Indies, and a southern half extending from the Cape through East Africa and the Sudan, by way of Egypt, Palestine and Iraq, towards India, Malaya, Australia and New Zealand, and thus forming a vast semicircle round the Indian Ocean which is more peculiarly a British ocean than any other. Within each of those two main geographical blocks modern developments are going to lead to closer communication. I have already referred to the future of the northern routes from England to Canada, and a new system of routes from the Cape to Cairo, from Cairo to India and to Australia are bound to come. Between those two main blocks communications will be maintained by the line of our naval stations and by more than one line of airship service. It has been said with great truth that only the submarine cable kept the British Empire together during the nineteenth century. I believe the airship and the aeroplane, together with the wireless and the telephone, may well keep it together during the twentieth century.

There is, however, one thing which we must not forget, and that is that all these developments affect not only ourselves but others. The process of drawing countries together by new methods of communication is bound to affect the world outside. Inevitably to an increasing degree the United States and Central and South America will be drawn together by what, under modern conditions, is geographical contiguity. Take Europe, split up into comparatively small units, Balkanized by that linguistic nationalism to which the Great War gave such exaggerated emphasis. When you consider the harassing obstacles to trade and intercourse created by those divisions, when you consider the terror which war in the air will be to such small communities, does it not seem almost inevitable that sooner or later the nations of Europe will, in some way or other, draw closer together and become, both for their own internal progress and security and for the development of their colonial territories, something in the nature of a single political unit or group? I believe that will occur as inevitably from the development of communications as previous developments brought us from the city states of the ancient world to the nation states of more recent times and to the empires of to-day. The world is, I believe, destined, sooner or later, to be reduced to a few great combinations: Europe with its colonies; the United States with the contiguous Central and South American nations; Russia, China, and Japan; last but by no means least, linking them all together, the British Commonwealth. It is, in fact, the largest both in area and population, with nearly 15,000,000 square miles and 450,000,000 inhabitants, compared with the 200,000,000 inhabitants of America south of the Canadian border on 12,000,000 square miles; with the 10,000,000 square miles and 400,000,000 inhabitants of Western Europe with its dependencies; the 9,000,000 square miles and 150,000,000 people of Russia; and the 4,000,000 square miles and 400,000,000 people of China. In all these ways it seems to me that it is more than a fanciful idea, more than a hope, that intercommunication and discovery are bound to have a political and economic counterpart in the gradual simplification of the world.

Well, ladies and gentlemen, I must leave these speculations and attend to my proper business, which is to propose the health of the Society, coupled with the name of your President. I do not think I need tell you much about the work of the Royal Geographical Society, except to say that your hopes and aspirations are being fulfilled, by the utilization of the money which you have received by the sale of some of your land in order to provide yourselves with an adequate hall. I know certain funds are still needed even beyond the proceeds of the sale of your land, and I most sincerely hope that those funds may be forthcoming and that we shall see, before the centenary of the Society in 1930, a hall and library truly worthy of this Society, and truly worthy of your late President, my old friend D. G. Hogarth. As for our President to-night, Sir Charles Close, both from the ordinary public point of view and from the point of view of the office which I hold, I know how great have been his services to the cause of geography in the field—in Africa, East, West and Central, and at home. The War Office owe him a great debt of gratitude for all he did for the Geographical Section, and we in the Colonial Office owe him no small debt for what he and Sir Herbert Read did together in inaugurating our Colonial Survey Committee, whose work has led up to the Empire Survey Conference which is shortly to meet. Sir Charles has been the recipient of the Victoria Medal. He has rendered great service not only to British but to world geography by all the work he has done and is doing for the International Geographical Union whose Congress opens next month. I am sure no small part of its success will be due to the labours of your President. My lords, ladies and gentlemen, I give you the toast of the Royal Geographical Society coupled with the name of Sir Charles Close.

The PRESIDENT, in responding, said: First of all, I want to thank you very much for the way in which you received the toast, and we all want to thank Mr. Amery for his kindness in proposing it. Mr. Amery, as you know, is a very travelled statesman. I believe he is the first Secretary of State who has visited Australia and New Zealand during his tenure of office. He has travelled widely all over the world, and has flown thousands of miles in 'Iraq and elsewhere; he has a mountain named after him in Canada, and one in South Africa. If that does not establish his name as a geographer, I do not know what does. There is one thing he needs in order to be perfect—but perhaps I had better not say what that is. The great department over which Mr. Amery presides has always been very friendly to our science. He mentioned my connection with the Colonial Survey Committee, which is now twenty-two years old, and has done a great deal to bring the surveys of the Crown Colonies and Protectorates together, and to encourage and stimulate them. We are very glad to welcome here not only Mr. Amery but one of his staff, Mr. Bottomley, who is Chairman of the Colonial Survey Committee. If I wanted to give further evidence of the fact that the Colonial Office is genuinely interested in geographic science I could not give a better instance than that it was the means of dispatching that important expedition to the Falkland Islands Dependencies of which we have lately had an account at one of the Society's meetings.

As regards the Society, we have many things on our minds. First of all, the building of the new hall and library. Now we do not want to sail under false colours. The Council know that the whole scheme will cost £50,000 or thereabouts, and we have £30,000 to start with. We have over 6000 Fellows. Surely we ought to be able to collect the difference from the 6000. Why, we might almost collect it from those present now! You will remember that we meet in a hall which has certain conveniences. The chairs are fairly comfortable, but I can assure you that it is not very convenient for the officials who sit on the platform. No one can approach them except by a steep flight of steps. Many here will remember the theatre at Burlington Gardens. It had many advantages. You could both see and hear very well. It is true that the seats were rather uncomfortable—in fact, it was almost impossible to sleep in them! Francis Galton, who, as you know, was Honorary Secretary of the Society for some years, used to count the fidgets, as Mr. Douglas Freshfield has related. He looked round the seats and when he saw anybody fidgetting he used to put a mark on the blotting-paper, and it would have been quite possible, and not in the least difficult, to obtain a mathematical expression which would indicate the relation between the subject being dealt with by the orator, the excellence of his speech, the length of time he took in developing it, and the considerable discomfort of the seats on which we were sitting.

The next subject that we have on our minds is the International Geographical Congress that is to take place in July in London and at Cambridge, meeting three days in London and eight days at Cambridge. I heard only a few days ago from General Vacchelli, the distinguished President of the International Geographical Union, that His Royal Highness Prince Amadeo of Savoy is coming with the Italian delegation. This country cannot be said to be overdoing it in the matter of Congresses in that the last Congress held in London was in 1895—thirty-three years ago. On the present occasion forty-six or forty-seven countries will be represented. A cordial invitation has been sent to the German authorities, but it is not yet quite certain whether representatives will attend from that country. We know representatives will be present from Turkey and Hungary.

The next matter on our minds is also in connection with the Congress, namely, the discussion of matters connected with the International Map of the

World. That was started by Professor Penck in 1891, and it has been going on slowly—too slowly for some enthusiastic cartographers. We got the standardized map at Paris and then came the Great War, which naturally resulted in a set-back. Now we think the map is going on fairly well; but I would draw your attention to the fact which has been recently enunciated by the distinguished Secretary of the Royal Society, namely, that the human race will probably exist for the next two thousand million years. Now it seems to me that we have not made such bad progress, if that fact is borne in mind If there are any map collectors present, I can assure them that the early sheets will be very valuable at the end of that period!

The next matter that we have on our minds is the Centenary of the Society. We are ninety-eight years old now. In two years' time we shall celebrate our centenary. We hope to do that in style, and we hope especially that our new hall and library will be built before that time. The completion of the hall and library will, however, depend entirely on the support that is received from Fellows of this Society. In connection with the Centenary I should like to announce that two distinguished Fellows, members of the Council, have undertaken to write a history of the Society. I must not say who they are, but I can assure you it will not be a dry history at all. There will be a good deal of the human element in it.

Now we are naturally talking about geography, and last year at the Annual Dinner, in another capacity, it was my privilege to explain what a geographer was. This time I should like to complete the picture by giving you an instance of a man who was not a geographer. A good many years ago it fell to my lot to make a map of that beautiful island of Jersey, which is 4 or 5 miles broad and 12 miles long. I happened to be in the club at Saint Helier where I saw a man I knew slightly, who said, "You are going to make a map of Jersey?" I admitted the impeachment, and he continued: "You know there are an awful lot of roads in Jersey. There are 7000 miles of roads." I expressed some surprise, and then we talked about other matters. Then his conscience smote him, and he said, "How many miles of roads did I say there were in Jersey?" I replied, "You said seven thousand miles of road." "Oh, that's all right; I thought I had said seven million"!

I quite agree with what Mr. Amery said with regard to the world growing smaller, but I do not think on that account it is getting less interesting. There is an enormous amount to be done. If you merely consult the records of our lectures you will see how much British geographers are doing all over the world. At the present moment there are in formation, or in actual existence, an expedition to Greenland under Dr. Longstaff, one of our Medallists; an expedition to the Drakensberg; one to the Great Barrier Reef, another to Labrador, while a lady is going to the Kalambo river. There is no need to tell this audience where that is. All this shows that there is a gread deal going on. Certainly I do not see any diminution in the activities of geographers all over the world; in fact, we realize that geographers have by no means finished their task. The subject grows and the interest of it never diminishes. I think that we shall all agree with Doughty of Arabia when he says, "Of surpassing interest to those many minds which seek after philosophic knowledge and instruction is the story of the Earth, Her manifold living creatures, the human generations and Her ancient rocks." To this we would add, "That great and wide sea also." Indeed, we are concerned with a study of surpassing interest. I thank you all.

Dr. H. R. MILL, in proposing the toast of "The Medallists," said: The Council of the Royal Geographical Society has no more pleasing duty—though none more anxious—than that of recognizing the best work in geography by the award

of medals. The toast of the Medallists of the year affords an opportunity to the Fellows present at this great gathering to confirm the judgment of the Council and acclaim the men whom the Society delights to honour.

When the Society was founded, ninety-eight years ago, its aims were "the promotion and diffusion of that most important and entertaining branch of knowledge—geography." King William IV. became the Patron of the new society in its first year, and he contributed annually a handsome gift from his Privy Purse as a royal reward for services rendered to geography; his example has been followed by all his successors on the throne. When Queen Victoria became Patron in 1837 it was decided to institute two medals equal in honour, one called the Founder's, continuing to bear the image of the Sailor King, the other called the Patron's with the bright young features of the new Queen. For more than sixty years these two medals were awarded annually while the age-old problems of geography were one by one being solved by the explorers who jewelled the world map with countless Victorias. When the long and glorious reign ended the Council resolved, while commemorating the King on the new Patron's medal, to retain the Victoria medal as a special award for geographical research to be given only when special circumstances justified it. Thus it comes about that three medals were presented to-day, and we celebrate in this toast the three names just added to the two hundred of the goodly fellowship who have already received what is universally recognized as the highest geographical honour the world can bestow. These medallists, and those who worked with them, have made many great discoveries, the greatest being the gradual establishment of the certainty that the forms of the Earth's crust revealed by exploration are important mainly because of the functions which they serve in the economy of Nature. Thus the Polar regions, and especially the Antarctic, are now known to require exploration less in order to map the mountains and coasts than in order to ascertain how these influence the circulation of the air, for it is now known that what is happening in the Antarctic exercises an influence on the weather of the whole world. So, too, the forms of the land and the nature of the climate control the life and the very nature of plants and animals everywhere, and ecology, or the relation of living things to their environment, is attracting more of the interest of geographers every year. The modern traveller is less concerned with exploration than with explanation. For this he must become a trained geographer; and during the last fifty years the Royal Geographical Society has devoted more and more of its attention to education and training. It has encouraged enlightened education in geography first in the public schools, then, against the dead weight of an immense inertia, in the ancient universities, and simultaneously by courses of instruction for intending travellers in the Society's house. The use of all the modern photographic and electrical methods in surveying and fixing positions has been taught to keep pace with the vast modern changes in means of transport on land, by sea, and in the air. The results have been most encouraging. Hundreds of young officers, colonial officials, and specialists in various sciences, have had a geographical turn given to their activities by the Society's Instructor. Oxford and Cambridge are simply bubbling over with enthusiastic young scientific explorers, and to-day the minor awards of the Society were given in appreciation of two successful summer excursions for research in the nearer Arctic led very effectively by undergraduates, one of Oxford, one of Cambridge. This is a happy augury.

For bringing about this notable advance Mr. E. A. Reeves, who to-day received the Victoria Medal for research, is largely responsible. He is a pillar of our Society which he has supported and strengthened by just fifty years of devoted service, in the course of which he has become Map Curator, head of

the cartographic staff, and Instructor in practical Astronomy and Surveying. As the presiding genius of the map room Mr. Reeves exercises the hospitality of the Society, not only to the Fellows but to the general public, which is free to visit that part of the establishment at Lowther Lodge. During more than half the lifetime of the Society he has known every one and established himself in the confidence of the Council and in the affection of his colleagues and his students. Too arduous in his duties to have been a traveller himself, he is the greatest trainer of travellers in history, and he may well be called a maker of medallists, for the Society's highest award has gone to seventeen of his students and minor awards to thirty-six more. It is not the length of his service to the Society which has brought him this distinction, but the value of the services he has rendered to geography. With his days full of his multifarious labours at the Society's house, and many of his nights invaded by teaching young explorers how to find their positions from the stars, Mr. Reeves has somehow found time to edit, and indeed very largely to write, that indispensable *vade mecum* the 'Hints to Travellers,' famous throughout the world as containing all that the modern explorer needs to know. More than that, he has a happy knack of invention, and he has produced a series of new and ingenious surveying instruments as well as helpful devices which simplify and facilitate observations and computations. He has also made far-reaching researches into the mysteries of magnetism, and is even now engaged in hunting for the cause of a discovery foreshadowing the possibility of a non-magnetic compass with no variation. The Gold Medal for research is indeed a fitting gift to reward his researches and to celebrate his golden wedding to geography. As his oldest colleague in the Society, and therefore one of his oldest friends and most sincere admirers, it gives me very real pleasure to have the privilege of associating his name with this toast.

The Founder's Medal has been given to Dr. T. G. Longstaff, one of Mr. Reeves's most successful students. He was educated at Eton and Christ Church, went on to qualify as a medical man, and was decoyed into geographical research along the primrose path of sport. As a mountain climber and a big-game hunter the high lonely places lured him on. The Alps soon proved too puny for his ambition, and he conquered (so the phrase goes) peak after peak of the Caucasus, the Selkirks, the Rocky Mountains, and the Himalaya. All his public school and university education, his professional experience, and the special training in the Alpine Club and in our own Society were drawn upon to make the observations on his many expeditions more complete and more exhaustive. Perhaps his greatest achievement was the discovery and survey of the great Siachen glacier, but he was a member of the second Mount Everest Expedition and in many other Himalayan expeditions, and he explored new peaks, passes, and glaciers, adding much to our knowledge of the most difficult countries of the world. Wherever he went, as leader or as medical officer, he carried in his own merry heart the best medicine for keeping up the health and spirits of his comrades. Latterly Dr. Longstaff has torn himself away from India's icy mountains, and he is at this moment leading the Oxford University Arctic expedition where Greenland's sunny fountains roll down between the flowery meadows of the west-coast fjords. We miss him because he would have given us a rousing speech had he been present, but we have the consolation to know that he is enjoying the earliest of his polar days under the never-setting sun; and we turn to greet the latest of our Polar knights, Sir Hubert Wilkins, who has received the Patron's Medal. I believe there are now only three knights who won their spurs in Polar service. All are Gold Medallists, all Australians—Sir Edgworth David, Sir Douglas Mawson, and Sir Hubert Wilkins. Surely these are the very "most intelligent of the British residents in the remote settlements of the Empire" with whom our

founders were so solicitous that we should keep in touch. In our Patron's Medallist we welcome one of those born explorers who seem to have looked on life first

"Through magic casements opening on the foam
Of perilous seas in fairy lands forlorn,"

And surely no more forlorn fairyland, no more perilous sea, ever loomed through the mists of poetry than that which Stefansson, his first leader, dares to call the Friendly Arctic. Stefansson learned the secret of living on the resources of the Arctic, and passed it on to Wilkins, who by turns was skipper, engineer, hunter, photographer, naturalist, meteorologist, snow-hut builder, and surveyor. It was a rough apprenticeship, followed by war service in the Air Force and then by the daring voyage on the little *Quest* when, after Shackleton's death, he entered the Antarctic ice. Lastly, he returned to the Arctic, which has brought him here. He has not got our medal for a lucky flight of twenty hours across the North Polar area, but for the twenty years' work of which that brilliant episode was the culmination. The fact that Wilkins resisted the temptation to be the first Australian and the first British subject to fly to the North Pole and set himself instead to a three-years' effort to explore the least-known parts of the Arctic Sea in pursuance of a defined scheme of scientific research, is what gives value to his Arctic flights. We rejoice to know that he has no intention of resting on his laurels, and we wish him the best possible success in his projected Antarctic researches. If we venture to utter one cautionary word it would be to remind him that no plans are complete and no expedition can be successful which do not provide a reasonable margin of probability for a safe return. As he has learned from his first leader Stefansson the shifts and expedients of life in the Arctic, so we hope he has caught from his last leader Shackleton that happy tempering of courage with caution which constituted his unique characteristic in the Antarctic. I could wish that it had been possible for him before his new expedition to translate the secret of the Albatross into mechanical terms, for in the fight with the blizzards of the Far South, victory must come to the man who, like the Japanese wrestler, can turn the strength of his adversary into a means of defence. Stefansson said that Wilkins was the most adaptable man he ever met, a splendid trait in one who has had to play so many parts and who has still to play many more—including that of the eagerly awaited speaker of this evening.

Capt. Sir HUBERT WILKINS responding, said: This is a very happy occasion for me, although it would have been much happier had my friend Dr. Longstaff postponed his expedition to Greenland, so that he might have responded to this toast. I am very pleased that Mr. Reeves, with whom I am honoured to be associated, is here to speak for himself. It has been my privilege, with Eielson, to have carried out, in a measure, something that was proposed by my old friend Dr. Stefansson many years ago. In 1913, when it was my pleasant duty to serve under Stefansson, he suggested that in the not far distant future we would turn our attention to the Arctic, to the northern regions, for exploration for the benefit of mankind. It happened in those years that Stefansson knew very little about flying, but it had been my privilege to learn something about it as early as 1910, so that we whiled away many hours in the Arctic in discussing the possibility of using airplanes for Arctic exploration as opposed to Stefansson's idea in those days, submarines. It so happened that I was able to demonstrate, even to Stefansson's satisfaction, that the airplane could be used with success in Polar exploration; not only airplanes but aircraft. As a result of the work we have done this year by the aid of airplanes we have learnt a great deal not only about geography but about geographers. It has been our pleasure during the last few weeks to meet geographers in many countries: in Norway, Denmark, Germany,

Holland, Belgium, France, and England. We have learned from them the international association and feelings of geographers, and I must not fail to take advantage of this opportunity to assure you that it was through the great help of my friend, Dr. Isaiah Bowman, the Director of the American Geographical Society, that it was possible for Eielson and me to carry out the work which has been recognized by your Society to-day.

In early days it was perhaps rather difficult for explorers to explain just why they wished to go to those Polar regions and suffer the extreme hardships of the frozen North or the frozen South, and perhaps many of them were ready to go to those regions because of the adventure. It so happens that we might blame adventure for my presence here to-night, because adventure is usually associated with narrow escapes. I have been told that the report of our flight across the Arctic from Alaska to Spitsbergen reached the Royal Geographical Society just a few hours before the Council met to decide as to the disposal of their Gold Medals for this year. So that if we accept the theory that adventure is associated with narrow escapes, it was a most narrow escape that I did not miss being awarded the Society's Medal and the privilege of being with you to-night.

Being here has led me to carry my memory back to another occasion, about twelve months ago, when we were not so fortunate as to be sitting down confronted with an excellent dinner. Then we were travelling across the Arctic ice faced with the necessity of proving our worth. Two years ago when we proposed to fly over the Arctic Ocean my friends in America who had come forward to give me the necessary assistance in order that I might carry out the work said, "What will happen if your engine fails?" It was only natural, after having had experience with Stefansson and learning from him and from the Eskimo how to take care of myself on Arctic ice, that I should reply, "Why, if our engine fails we shall walk home," which seemed on that occasion to be taken as a joke. Just twelve months ago we were forced to prove whether it was a joke or whether I was in earnest, and it was possible for us to follow Stefansson's method of travelling over the ice and taking care of ourselves in those Arctic conditions. I think when we left our airplane on the ice some 125 miles from shore and went back to the Alaskan coast we proved how well Stefansson had done his work in instructing us in methods of travelling over Arctic ice.

During our flight it was not always possible for us to sit down to a sumptuous dinner. We were not able to carry very great loads over the rough Arctic pack-ice, and we found it necessary to conserve our food supply. We found that in living for eighteen days on Arctic pack-ice we consumed about 14 ounces each per day. That gives me some encouragement when I think of the plight of my great friend, General Nobile. We learn from the Press and from his despatches that he has with him a certain amount of food, and I believe that there is possibility that he and his companions will be safely rescued in the very near future. After having met General Nobile and learning from him the value of his experience in 1926 with the airship *Norge*, I am sure he made very excellent preparations for his trip this year. I believe that, faced with the exceptional conditions in which he finds himself to-day, he will prove to his companions and to the world that he is not only a successful and capable aeronautical engineer, but that he is also a very excellent explorer and will prove able to take care of himself and those with him.

While it has been our privilege this year to complete a programme put before the American Geographical Society and our friends in that country three years ago, a programme which did not include the visit to the North Pole, I cannot let this opportunity pass without telling you that it would not have been possible without the help of a man, first selected from the number who approached me,

as many of us are approached when setting out on an expedition, a man who has been with me for the past three years, who has lived with me night and day in the Arctic, who has flown with me for more than 15,000 miles over Arctic regions, a man in whom I have learned to have the greatest confidence in the most extreme conditions—I refer to my companion, friend, and pilot, Lieutenant Carl Eielson. No matter what privileges those of us who have the good fortune to lead an expedition may have, no matter what opportunities we may have personally for carrying out the work, we are dependent on our associates, and I could not, no matter how I searched the world, have found a better companion or one who would face exceptional conditions in a better manner than my friend Eielson. I have been very proud to be associated with him on this expedition, as I have also been proud to have had the honour of carrying with me the flag of the United States, though it puts me in rather a difficult position. While it has always been my desire to carry out such work as it is possible for me to do under the British flag, I realize that the work is necessarily of international importance. It has been rather unfortunate, perhaps, that our British friends have not been in a position to help financially with the expeditions, and that they have to depend on the help of our friends elsewhere. I am certain that with the last, as with the next expedition, my American helpers will feel that they are assisting not because of their own personal interest in the work but because they realize that the British people and those of us whose privilege it is to explore regard such work as of international importance.

That brings me to the last point that I wish to mention to-night, and that is the actual work being carried out to-day in the Polar regions. My friend, Commander Byrd, referred not long ago in an article to the *x*, or unknown quantity, in exploration, and for many years it was difficult for explorers to explain that unknown quantity. I think we have reached the point, owing to the efficiency of the work carried out by previous explorers, when we are able to indicate, even to the man in the street, the economic advantage of Polar regions, because we hope, after completing a series of investigations in those regions, to be able to put forward a plan of meteorological development that will, not in the near future but in the not too distant future, enable us to forecast seasonal conditions with comparative accuracy. You will all realize the value of that to private individuals throughout the world. Although Commander Byrd and myself hope in carrying out the plans for our Polar expeditions—and we have been working together for three years—to be able to prove to geographers and others interested that our work is of some economic importance, we realize that we can only expect to carry it out successfully because of the great number of observations that have been so faithfully and well carried out by the explorers who have gone before.

Mr. E. A. Reeves also responded and said: Dr. Mill has made very generous remarks about me and the work I have tried to do during the many years that I have been connected with the Society; but there are some astonishing things I have learnt about my doings from the newspapers during the last few days that seem to have escaped him. It is surprising what wonderful and interesting things one can find out, at times, about oneself from newspapers.

I do most sincerely thank Dr. Mill for all the kind things he has said, and the Council for the great honour that has been bestowed upon me in the award of the Victoria Medal. Probably some one had reminded the President that I had been fifty years in the service of the Society, for a few weeks ago he came to my room and began to talk about this. I wondered what he was going to say next, and thought perhaps he was going to tell me it was time I cleared out and made room for a better man. But he did not. He was very kind and said some nice

things, among which was that he thought some of my friends would like to commemorate my jubilee in some way. Naturally I was very pleased, and pictured in my mind some such present as a nice little silver mug with a suitable inscription upon it. Certainly the Society's Victoria Medal was far beyond anything I could have thought of or anticipated; but I can assure you that I appreciate this most generous recognition of my fifty years' service more than I know how to express.

It seems hardly possible that it is fifty years since as a lad of sixteen I joined the staff of the Royal Geographical Society as junior assistant in the Map Room at 1 Savile Row under my old friend and predecessor Mr. John Coles, whom some of us still remember with affection and respect. I must confess that I found my duties trying and difficult, but my greatest difficulty was to hide my ignorance, especially on all matters geographical. A man would come and ask for a map of a place I had never heard of, but which I felt I ought to know all about, and the trouble was to find what he wanted without exposing my want of knowledge. When I got into too great a fix Mr. Coles would come to the rescue, and by degrees I began to get a little more acquainted with things. After years of strenuous work and hard study in spare hours I managed to hold my own, so that when Mr. Coles retired in 1900 the Council put me in his place as Map Curator, and the next year I was made Instructor in Practical Astronomy and Surveying. In 1904 the Map Drawing department was also put under my supervision. With the valuable assistance of Mr. Allen in the Map Room and other good helpers I have carried on these combined duties until the present time.

When I first joined the Society's staff a great deal of the Earth's surface was entirely unexplored, and one of the first things I remember doing was to copy out a list of instruments to be taken by Joseph Thomson on his famous journey from Mombasa to Victoria Nyanza. Another interesting piece of work that early fell to my lot was to help Sir Clements Markham (or Mr. Markham as he was then) to prepare a list of maps to accompany his 'Fifty Years' Work of the Royal Geographical Society,' which he was then writing, and now we are just about to celebrate the centenary of the Society! It seems incredible that fifty years have passed in the interval.

My duties have at times been arduous, but very pleasant. The instruction has, of course, meant a great deal of work, but the results have been most gratifying. Almost every exploring expedition that has left our shores, and many from other countries, have had some pupils of mine attached to them, and the work done by them has been most important.

I have had altogether under my instruction between 600 and 700 explorers and travellers, in addition to special classes of 20 to 50 each that have frequently attended for short courses in elementary mapping.

Well, the hour is late, and I will not keep you longer, but would again tender my sincere thanks for the honour done me in the award of the Victoria Medal.

Field-Marshal VISCOUNT ALLENBY then proposed the toast of "The Guests" and said: How wide are the interests of Geography is surely well exemplified by the characteristics and qualities of our guests this evening. We are honoured by the presence of the Ambassador of Italy, the representative of a country whose interests are closely allied with ours, a country working in unison with us for the betterment of mankind in remoter regions of the world. I am sure we all share the anxiety the Ambassador and his countrymen must feel in regard to the position of that gallant gentleman, General Nobile, who is now somewhere in the Arctic Circle. I saw a telegram before I came here this evening stating that he had seen one of the aeroplanes sent to his rescue. I do not know what truth there may be in it, but I am sure you will all join with me in the hope that that

gallant gentleman and his companions may be rescued very shortly; that those valuable lives may be spared to science and to that great and noble country.

From 'Iraq comes my old and valued friend, Jafar Pasha el Askari. The country from which he hails was probably the earliest to engage in geographical study and activity: fully 4000 years ago, according to Babylonian records. The Secretary of State for the Dominions is with us. His energy and enterprise have impelled him to visit, by land, air, and sea, the uttermost parts of the Empire; and he has gained a more intimate personal acquaintance with Imperial geography than has any one else in our history. We welcome also the High Commissioner of the Union of South Africa—that land of abounding prosperity and fair promise. The President of the Geographical Society of Manchester is here; and the Geographical Society of South Australia is represented by a distinguished member. These gentlemen, as geographical experts, will keep watch that we wander not too far from the track of pure geography into regions of ethnology, astronomy, geology, meteorology, and other branches of science, all of which are of great importance to geography.

The Astronomer Royal is with us to-night, and we have to thank him for having prevailed on the powers that rule the ether at Rugby to transmit twice a day Greenwich Time Signals to practically all parts of the world. Without the aid of the astronomer where would the geographer be? When the geographer wishes to hitch his waggon to a star, he is able to seek expert advice as to which star will give the best hold. Without astronomy the geographer would be helpless. You may remember that, in the seventh century B.C., certain Phœnicians claimed to have circumnavigated Nubia, or what is now the continent of Africa, starting in the Red Sea, and returning through the Straits of Gibraltar, or Pillars of Hercules. Their story was doubted, because they told how, during their journey westward, the sun was on their right hand. The Astronomer Royal would, I think, assure us that this statement, so far from casting doubt on the claim, was strong corroborative evidence that they had gone round the Cape

I can cite another instance regarding astronomy that comes within my own knowledge. Many years ago in South Africa I had occasion to explain to a Staff Officer, who was 180° out in his bearings, that in the Southern Hemisphere the sun at midday is in the north. He was pleased with this item of knowledge—which was new to him—and generously wished to share it with others. Not long afterwards he gave a lecture on Reconnaissance, in the course of which he spoke as follows: "It is important that the soldier should know that in South Africa the apparent motion of the sun is reversed. The sun is in the north at noon; it rises in the west, and sets in the east." You may not believe me, but that is a fact, and I tell it in order to impress upon you the danger of a little learning, and the value of a sound knowledge of astronomy.

The First Sea Lord is here to-night, and also Captain Feakes, who represents the Royal Australian Navy. We have with us an Air Vice-Marshal, and also the Director of Military Intelligence. The Sea and the Air Forces lend to the geographer scope of action and of vision; and, moreover, protection in the pursuit of information, which is recorded by the Director of Intelligence and utilized for the needs of Imperial Defence. Our guest, the President of the Institution of Civil Engineers, represents a branch of Science which is of material assistance to the geographer in his travels and his research, and in Mr. Bottomley we have the Chairman of that Colonial Survey Committee which assists so much the geography of the Empire. Our architect is also one of our guests to-night; we look to him to provide the Royal Geographical Society with a hall and library of that repose and dignity worthy of the Society's high standing. Mr. Douglas Gane is

known not only to us but especially to the dwellers in that far-away island of Tristan da Cunha, to whom his visits by proxy are as welcome as were, no doubt, the visits of the ravens to the prophet Elijah. Dr. Erik Nilsson has been doing great work in the Rift Valley, where Mr. Leakey has met with such success in discovering traces of prehistoric man. We are also greatly honoured to-night by the presence in our midst of the heroes of the recent flight over the Arctic, Sir Hubert Wilkins and his companion Lieutenant Carl Eielson.

I have not forgotten—and you have not forgotten—the ladies who grace our board, to whose influence and companionship their illustrious consorts owe the inspiration which has lifted them to the positions they occupy in the Hall of Fame. I ask you to drink with me the toast of "The Guests," coupled with the names of the Italian Ambassador and Lieutenant Carl Eielson.

H.E. THE ITALIAN AMBASSADOR: The Royal Geographical Society could hardly have chosen as proposer of the toast a more illustrious and suitable spokesman than Field-Marshal Lord Allenby. In rendering the British Empire the signal services of which we are all aware, both in war and peace, he has undoubtedly gained such a knowledge of known and less-known countries of the world as enables him to rank worthily among professional geographers. My fellow-guests and myself feel, therefore, doubly honoured and grateful for his kind words.

If I have hesitated, as your Secretary knows, in accepting the privilege of responding to the toast of "The Guests," it is certainly not because of lack of appreciation of the honour offered to me, not in order to deprive myself of the pleasant duty of thanking the Royal Geographical Society for their hospitality. What made me reluctant to speak as a guest of the Society was the feeling of incompetence. I think, however, I should perhaps be less familiar with things geographic had I not spent most of my life in the diplomatic service, which affords often enough the opportunity of refreshing one's memory in this field of knowledge. In this respect I consider myself also very fortunate in that I am able to serve my country in London, from which such a great portion of the world is ruled. It frequently happens that, on receiving reports from Consuls in various regions of your vast Dominions or owing to some colonial question, I feel compelled to undertake rapid journeys of geographical exploration through the atlas.

Having overcome my hesitation and gladly accepted the invitation to respond to the toast of "The Guests," I sought for qualifications which could somewhat justify the most courteous choice of myself as speaker, and tried to ascertain what are the ties of common interest connecting the history of Italy and Great Britain both in the field of geographical discovery and exploration. It is with the object of substantiating this claim and not with the mere desire of boasting national glories that I wish to recall the names of Marco Polo, Christopher Columbus, Amerigo Vespucci, Giovanni da Verrazzano, and, at the present time, H.R.H. the Duke of the Abruzzi, Filipo De Filippi, Umberto Cagni, and H.R.H. the Duke of Spoleto, who, with the gracious consent of the Government of India, is preparing an expedition to the Karakoram. Let me recall also the name of General Nobile, whose plucky Arctic venture and present plight have evoked not only in this country but all over the world feelings of admiration and sympathy, besides prompting offers of assistance for his rescue. To these names I wish to add, with particular pride, those of John and Sebastian Caboto or Cabot, both a credit to our two countries, having put the adventurous spirit of their seafaring Genoese race at the service of your young world-conquering nation.

I have read with great interest the little but substantial pamphlet on the

foundation, history, and work of the Royal Geographical Society, and I am delighted to note that their wonderful activity meets with the gratifying reward of a steadily increasing fellowship. And justly so, for few scientific institutions deserve more popular support than yours. Besides being of practical and highly scientific value, geographical exploration and discovery, which in early days were mainly promoted by the spirit of adventure, the desire of conquest or of personal gain—though often also by nobler purposes of religious proselytism—are contributing towards keeping alive, even into our present mechanized age, those qualities of manly courage, endurance and, often, heroism which exalt Geography's pioneers in the eyes of laymen. No man or woman with a healthy curiosity for knowledge, or some sense of romance, can help reading with keen interest the reports of expeditions into far-off or unknown regions, whose existence or aspect most of us would never have known of but for the love of science on the part of daring geographers.

I have also learnt with profound admiration the merits for which Queen Victoria granted this Society the Royal Charter of Incorporation. The records of geographical expeditions of historic importance, the names of which are linked with that of the Royal Geographical Society, the reports being published in the Society's *Geographical Journal*, enhanced by beautiful illustrations, are brilliant proofs of the way in which the Society knows how to respond to the royal favour bestowed upon it. No other geographical society is likely to be able to boast of so many illustrious Fellows, both living and past, with such an extensive first-hand geographical knowledge of all the lands and seas of the world. I feel, therefore, very grateful indeed for the privilege of spending with you such a delightful evening, and I want to offer you my heartfelt wishes for the ever-increasing prosperity of the Royal Geographical Society, which has always so mightily fostered the advancement of the knowledge of the world in which we live.

Lieutenant CARL EIELSON also responded and said: I feel some embarrassment in rising to address you, but I am pleased to be here and to have come to your country by a new route. The first I saw of Europe was the north-east end of Spitsbergen. We in Alaska feel, and I am speaking as a resident of Alaska, that we owe much to early British explorers. Flying over various parts of Alaska and at other points we noticed various features named after British explorers, and in talking to many of my old Eskimo friends I learn very interesting details of the people who visited them from an unknown country. I have often wondered at the nerve those early explorers displayed in visiting a country in which they were not sure whether their reception would be friendly or unfriendly, and working under conditions which were unknown at that time. Now explorers are able to visit such parts of the world and benefit by the experience and records of those who have gone before.

At the last place in which we lived in Alaska there was an Englishman who has lived on the north coast of Alaska for nearly forty years. He has an Eskimo wife, and I was much impressed by the way in which he had solved his domestic problems. I remember being in a trading post one day when he came there with his wife and suddenly began to curse her. I looked round and asked him if he meant what he said, and he replied, "Oh, that's all right; she does not understand a word I say." That was after forty years of married life! There was also an Englishman from Liverpool who told me what a wonderful city it was when he was there before the war. When I asked him what he meant by "before the war" he said, "I mean the Spanish-American War in 1897"! I wish to express my thanks to the Royal Geographical Society for the privilege of being present this evening.